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A SIMPLIFIED METHOD OF CONDUCTING McDOUGALL'S SPOT-PATTERN TEST.

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(*Studies from the Cornell Educational Laboratory, No.* 20.)

SUMMARY.

The problem was to determine whether the rather complicated method developed by McDougall and used by other English investigators for conducting the spot-pattern test (series of five very short exposures, delivered by interrupting transmitted light at stated intervals) could be replaced with no loss in diagnostic value by a simpler method (single exposures with an ordinary tachistoscope and reflected light).

The quantitative results demonstrate that these two methods are interchangeable so far as rank-order of the subjects is concerned. The qualitative results reveal no marked or constant differences between the mental processes operative under the two sets of conditions.

The conclusion is reached that this test, which appears to have fairly high correlations with general intelligence, may be conducted by a much simpler method than that employed by its originator, and with no loss to its diagnostic value. No claim is made, however, that these results for adults will necessarily hold true in work with children.

THE PROBLEM.

The "spot-pattern test," first proposed by McDougall (3), and subsequently employed by Burt (1), Burt and Moore (2), and Schuster (4), warrants special attention because of the high correlations found between performance in it and estimated general intelligence. But the technique and apparatus which these English investigators have developed for the test renders it unduly difficult of administration, and tends to re-

duce the reliability of the results obtained by it. The following description by Burt (pp. 150ff.) will serve to describe the test and to explain this technique.[1]

"A card 10 cm. square is pierced with eight or ten holes, each 1 mm. in diam. These perforations form an irregular pattern within an area 1.5 in. square, but always coincide with the intersections of any imaginary system of vertical and horizontal lines ¼ in. apart. One face of the card is now covered with clear, dead-white paper and the whole card is placed in an aperture of a screen in the path of a beam of light to *S*'s eye. By means of a photographic shutter the light is flashed upon the card in groups of 5 flashes, each lasting 20 σ, and at the rate of one every 2 sec. After each series of 5 flashes, *S* is asked to make a map of the spots of light upon a bit of squared paper 1.5 in. in size, ruled to correspond to the system of lines above mentioned, *i. e.*, in ¼ in. squares. He is told the number of spots and that each spot must fall at the intersection of two lines. He attempts a new map after each 5 flashes, until he makes an accurate reproduction."

The spot-pattern test is evidently a variation of the ordinary tachistoscopic tests for range or scope of attention, but with a much more complex method. The problem that we undertook to solve by experimentation was: would equally reliable diagnostic values be secured if the spot-patterns were displayed in an ordinary tachistoscope, *i. e.*, with a single exposure instead of a series of exposures, with relatively long instead of relatively short exposures, and illumined by reflected instead of transmitted light? To answer these questions it was planned to compare the quantitative results secured under both methods and to secure introspective accounts of the mental processes involved in them.

Subjects.

The experiments were performed in the Educational Laboratory at Cornell University during the second semesters of the academic years 1911-12 and 1912-13. The subjects were Dr. Day (*D*), Messrs. Dallenbach (*Da*) and Johnstone (*J*), graduate students in psychology, Mr. Foster (*F*), research assistant in psychology, and Mr. Ruckmich (*R*), instructor in psychology. They were highly-trained observers, especially *D* and *F*. Besides these, two undergraduates, Messrs. Goldstone (*G*) and Machatt (*M*), who were doing work in education, were subjects in the experiments for the quantitative results.

[1]For further description see Whipple (5).

Apparatus.

We needed two pieces of apparatus for the experiment, the one to reproduce McDougall's conditions, the other to fulfill the requirements of the longer exposure time.

The one apparatus, then, was so devised as to reproduce in all essentials the experimental conditions of the portable tachistoscope used by McDougall. In a vertical screen of white cardboard an opening 4.7 cm. square was cut at a height such that it would be on the level with the subject's eyes when seated in front of the apparatus. Around three sides of this opening were pasted strips of cardboard, to form a frame for holding the exposure-cards. The illumination of the cards was given by a 16 candle-power frosted incandescent lamp, fitted with a semi-circular cardboard reflector, and mounted about 12 cm. directly back of the opening. A simple telegraph key, introduced into the lamp-circuit, enabled *E* to close or open the circuit at will. Instead of the photographic shutter used by Burt and McDougall, we used a revolving cardboard disc to make the series of exposures. With the aid of a kymograph this disc, 45 cm. in diameter, was rotated vertically just behind the screen. A notch of 10 deg. was cut at one point of the disc, and the speed of the kymograph was so regulated as to give exposures of 0.04 sec., at intervals of 1.5 sec., when this open notch passed between the lamp and the exposure-card.

The other apparatus was a laboratory-made model of Whipple's disc tachistoscope (5, 264ff.). The two pieces of apparatus were then both disc tachistoscopes. They were as alike as could be, except for the conditions under comparison, viz., transmitted versus reflected light and short serial versus long single exposures.

For convenience, the McDougall apparatus will be referred to as Apparatus T (transmitted light), and the other as Apparatus R (reflected light).

The exposure-cards for Apparatus R were virtually identical in pattern with those of Apparatus T, only here the dots were ink-dots, because the cards were to be illumined by reflected light. Daylight illumination was reduced to a negligible amount by black window curtains, and the room was artificially lighted by electricity.

Procedure.

Experimental Series I. In this series there were three sets of patterns, one of 8-spot, one of 9-spot and one of 10-spot cards for each apparatus. Each set contained 20 patterns. The patterns for Apparatus R were the same as those for Apparatus T. And, further, the second half of the 8-, 9- and 10-spot patterns were the same as the first half, only turned around at an angle of 180 deg.[2]

Now, obviously, a subject could not have the same patterns for Apparatus R as for Apparatus T and, yet, different patterns could not be used with the two pieces of apparatus, because it would then be impossible to get a reliable basis for the quantitative and qualitative comparisons. To fulfill this condition, therefore, we divided our subjects into groups.

Group I (comprising *D, Da* and *G*) were given the first half of the three sets of patterns devised for Apparatus T, and also these same patterns, turned at an angle of 180 deg., devised for Apparatus R.

Group II (*J, M* and *R*) were given the remaining patterns. Each group thus worked through three sets, which contained half the number of patterns contained in the three full sets. In this way the patterns which were presented to Group I in Apparatus T were given to Group II in Apparatus R; and those presented to Group I in Apparatus R were given to Group II in Apparatus T.

Practice effects were distributed by changing the subjects from one apparatus to the other after each step in the experiment, *i. e.*, as soon as the pattern had been correctly reproduced. Group I began the series of experiments with Apparatus T and Group II with Apparatus R.

S sat at such a distance from the apparatus that his eyes were 45 cm. from the exposure-card, and in such a position that his

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[2]It was necessary to make use of some plan of this kind, because the area of the pattern was so limited that it would have been impossible to make 20 different patterns with each given number of spots and have them all of sufficient difficulty. It may be mentioned that no subject noticed that any given pattern had been presented before at a different angle. Once or twice only a subject thought that he had had the pattern before, but in these cases it happened that he was mistaken.

eyes were fairly on a level with it. He was given a "ready" signal 1.5 sec. before the exposure. Prepared sectional paper on which to reproduce the design was placed before him. These squares of sectional paper were laid off at one side as fast as they were used, but they were not concealed from *S*'s view.[3]

The general purpose of the problem was known to the subject, and specific instructions were also given to him. For Apparatus T: "There will be a 'ready' signal, and shortly afterwards you will see a pattern of 8 spots [or 9 or 10 spots] lighted up by transmitted light for a fraction of a second, five times in succession. You are then to reproduce the pattern on this prepared sectional paper. The pattern is such that the whole design will fall within a large single square of the paper. The large square contains 36 small ones, and each spot will fall at the corner of a small square. If you fail to reproduce the pattern correctly the first time, the exposure will be repeated until you are successful."

The same instructions were given for Apparatus R, with the substitution of "reflected light for a brief period" for "transmitted light for a fraction of a second, five times in succession." Those subjects who also reported upon the qualitative aspects of the work were given appropriate directions for that.

Experimental Series II. Another set of experiments consisting of two sets of patterns—9-spot and 10-spot patterns—was carried out with Apparatus T for some subjects (*Da, F, J, R*). This series was very short.

McDougall at first allowed his subjects to try to reproduce the pattern after each exposure, but this was found confusing

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[3]It is not clear whether McDougall, Burt and Schuster permitted their subjects to keep their several attempts at reproduction in view. The instructions set for the test in my *Manual of Mental and Physical Tests* and ordinarily followed in the Cornell Laboratory are to conceal these attempts as soon as they are made. It was intended that this procedure should also be followed in the present experiment, but Miss Goudge, who did most of her experimental work during my absence in Europe, interpreted Burt's instructions to indicate that the attempts need not be concealed. It is impossible to say just what effect this change in method may have had other than to have reduced the number of exposures necessary for a perfect reproduction. In any event, whatever effect was present was a constant factor in both the methods under comparison.—G. M. W.

to them, and he concluded that a short series of exposures was better. As finally developed, then, his method called for an attempt at reproduction after every group of five flashes. The intervals between the exposures in the groups were equal, and in this way a better control of the mental processes was thought to be attained. Each of the short exposures represent for McDougall a quantitative unit, and it is in the terms of them that the subject is scored. Now, it seemed to us that if the flashes were such units, their full value as units would be diminished by giving the subject a chance to draw the pattern correctly from five flashes only. For example, suppose the subject reproduced the given design correctly after three trials of five flashes each, his score would be recorded as 15 units. Now, it is really quite conceivable that his score was somewhere between 10 and 15 units. With this in mind, we carried out three experiments after each set, wherein the subject was asked for a reproduction after each flash. These patterns were obtained by turning some of our earlier patterns at an angle of 90 deg. No subject recognized a previous pattern. Introspections were required after each trial.

Quantitative Results.

Experimental Series I. A glance at Table I shows that all the subjects reproduced the 8-spot patterns correctly with fewer repetitions in the case of Apparatus R than in the case of Apparatus T. Tables II and III show the same for the 9- and 10-spot patterns.

Table I.

Mean Number of Exposures Necessary for a Correct Reproduction.[1]

(*8-Spot Patterns.*)

Subjects.	Apparatus T.	Apparatus R.
Da.	8.5	2.0
D.	12.5	4.7
G.	21.0	8.5
J.	19.5	5.4
M.	22.5	4.4
R.	13.5	3.3

[1]Scores for Apparatus T in all three tables are based on the single flash as a unit, *e. g.*, a score of 10 means two exposures of 5 flashes each.

TABLE II.

Mean Number of Exposures Necessary for a Correct Reproduction.

(9-*Spot Patterns.*)

Subjects.	Apparatus T.	Apparatus R.
Da.	5.5	1.3
D.	9.5	2.6
G.	23.0	6.5
J.	20.0	5.4
M.	16.5	3.7
R.	9.5	2.6

TABLE III.

Mean Number of Exposures Necessary for a Correct Reproduction.

(10-*Spot Patterns.*)

Da.	9.0	1.9
D.	9.0	2.4
G.	20.5	5.1
J.	16.0	2.9
M.	13.5	3.2
R.	15.0	2.7

Obviously, these results as they stand show nothing either for or against using Apparatus R as a substitute for Apparatus T in the spot-pattern test. They simply show that under the conditions used a single exposure of 1.5 sec. is not as effective as a *group of five* exposures of .04 sec. each. But, if we now arrange the subjects in order of rank for Apparatus T and again for Apparatus R, and if we find that the rank-order of R corresponds with that of T, then we shall have strong evidence that the one apparatus can be as satisfactorily used for the test as the other. The result of such treatment is shown in Table IV, where we see that, with five

TABLE IV.

Subjects Arranged According to Rank.[5]

	8-Spot Patterns.		9-Spot Patterns.		10-Spot Patterns.	
Subjects.	App. T.	App. R.	App. T.	App. R.	App. T.	App. R.
G.	210	85	230	65	205	51
M.	225*	74	165*	37*	135*	32
J.	195	54	200	54	160	29
R.	135	33*	95	26	150	27
D.	125	47	95	26	90	24
Da.	85	20	55	13	90	19

[5]The asterisks show the exceptions to the order. The means in the previous tables are here multiplied by 10.

exceptions, the same rank-order holds for all the conditions. This alone would seem a sufficiently close approximation to warrant the use of either apparatus for the test. At the same time, in order to obtain further evidence of our conclusion, the coefficients of the correlation between the mean-values obtained with Apparatus T and those with Apparatus R for the three sets of patterns were next worked out by means of the Pearson formula. From the results shown in Table V we see that all three sets of patterns give a high positive coefficient—especially the 9-spot patterns, which give a coefficient of .99. These coefficients have also a high degree of reliability, as the values for the probable error show. We are, then,

TABLE V.

Correlations Between Performances[6] with Apparatus T and Apparatus R.

Pattern-Sets.	Correlation.	P. E.
8-Spot Patterns	.92	.042
9-Spot Patterns	.99	.008
10-Spot Patterns	.87	.069

fully justified in assigning equal diagnostic value to both methods of conducting the test, at least for adult *S*'s.

Experimental Series II. Our results from these experiments show that in over 70 per cent. of the experiments the subjects reproduced the presented pattern correctly in less than five actual exposures, while in the remaining experiments the reproduction was made in less than 10 trials—only once in exactly five trials (see Table VI).[7]

TABLE VI.

Results for Experimental Series II.

Pattern.	9-Spot Patterns.			10-Spot Patterns.		
	D.	J.	R.	D.	J.	F.	R.
I	3	6	8	1	2	4	4
II	2	6	2	3	6	2	4
III	2	5	2	1	7	3	2
Mean	2.5	5.7	4	1.6	5	3	3.3

[6]See Tables I-III.

[7]One subject (*Da*), near the beginning of the experiments with the 8-spot patterns, said that he was sure that he could get a correct copy more easily by one flash than by a group of five. Accordingly, we made our one deviation in our procedure, giving him an 8-spot pattern, which did not form a part of the regular set, and he did really reproduce this correctly in one flash as he had predicted.

Qualitative Results.

In order to gain all the information possible concerning the two methods the quantitative results have been supplemented by quite detailed and systematic introspective reports from our most competent *S*'s concerning the mental processes operative under both methods during the period from the "ready" signal to the exposure, during the period of the exposure and during the period after the exposure while the pattern was being reproduced.

Despite certain individual differences, such as would be quite natural, the introspective accounts exhibit so much similarity that a general summary for all *S*'s will suffice for the purposes of this report. The important point is that there is not only a general similarity between the introspections of the several *S*'s, but also between the introspections for the two different methods. The qualitative records, then, reveal no reason why the simpler method of single exposures by reflected light may not be substituted for the original and more awkward method used by McDougall, Burt and others in England.

The following are the main points of similarity in regard to the mental processes concerned in the learning and the reproduction:

(1) During the exposures the subjects invariably arranged the dots subjectively into groups. Attention was now on one group, or figure, and now on another. In experiments with Apparatus T it is usually remained on one group during the flash-like exposure, and the shift of attention, accompanied by eye-kinaesthesis, occurred in the intervals between the exposures. Notwithstanding the difference in conditions, a very similar method was followed with Apparatus R. There, too, attention would shift from group (or figure) to group. The five momentary exposures with the intervals between them used with Apparatus T, therefore, form practically one long exposure, and may be likened to the exposure with Apparatus R.

(2) There was frequently verbal kinaesthesis relevant to the grouping in the mid-period also.

(3) Three subjects (*D, Da, F*) mentioned an after-image

of the preceding figure (or figures) during the intervals between the momentary exposures of Apparatus T.

(4) The following factors were usually present in the reproduction: (*a*) visual imagery, (*b*) verbal kinaesthesis (*J* excepted), (*c*) eye-kinaesthesis (*D* and *R* excepted).

When our *S*'s were asked to make direct comparisons of the mental processes set up by the two methods, their testimony showed again that the method of learning and reproduction is, in the main, the same for both kinds of apparatus. The following include the essential, though minor, differences reported:

(1) The "dots were more intensive" in the case of Apparatus T (*Da*).

(2) They make greater claim on the attention (*F, J*).

(3) The successive acts of attention are objectively separated in Apparatus T, "whereas, in the other experiments, one has to do one's own separating of these during the exposure itself" (*F*).[8]

(4) *F* experiences exceptionally strong strain sensations throughout the experiment with Apparatus T, while the reverse is true for *J*.

(5) *R* usually finds work with Apparatus T unpleasant, due to three factors: (*a*) noise of the motor, (*b*) "cutting off of initiation of eye-movement," (*c*) translating the bright dots on the darkish background (during the learning) to black dots on a white ground (in their reproduction). *F*'s statement, twice made, that "the interval" (referring to the momentary exposures) "is for consciousness practically a

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[8]We understand that McDougall favored a brief exposure, partly to stimulate attention, and partly to render the attitude of various *S*'s toward the task more nearly alike, and that five brief exposures were used instead of one in order to shorten the time of the whole experiment and not to let attempts at reproduction interfere with the development of the perception before it was fairly well begun. *F*'s introspection is the only bit of evidence revealed during our experiments that might be construed as partially justifying McDougall's experimental technique, since it suggests that a series of objectively distinct brief exposures tends to regulate and distribute the several acts of attention given to the pattern by *S*. Not enough tests were made with *F* to determine whether the introspective distinction which he made would be paralleled by a discrepancy between his quantitative performances with the two methods.

part of the whole period," substantiates our inference given above.

The essential introspective features brought out by Experimental Series II are:

(1) During the exposure attention was usually focused on one group only; but, sometimes, on two, just as in the momentary exposure with Apparatus T.

(2) *Da* and *F*, who were accustomed to have after-images in the interims between flashes in Apparatus T, Series I, got after-images here also, directly after the exposure, and used this time, during which these images were present, as if it were part of the real exposure time, *i. e.*, they used it for learning the pattern.

(3) All *S*'s used visual imagery in the reproduction. *Da* and *F* often had kinaesthetic cues as well, and *G* sometimes drew the figure quite automatically.

Summary of Main Results.

(1) In Experimental Series I the ranking of the subjects for the experiments with Apparatus T is, with a few exceptions, the same as that in the experiments with Apparatus R, so that there is a high positive correlation between the values obtained with Apparatus T and Apparatus R.

(2) In Experimental Series II, with one exception, the subjects always produced the pattern correctly in a number of trials other than 5 or any multiple of 5.

(3) The subjects learned the patterns by grouping the dots.

(4) Usually a visual perception of one group only was attended to at once. In experiments with Apparatus T attention remained on a group during a momentary exposure and shifted between exposures. With Apparatus R there was a similar shift of attention during the mid-period, though this shift was not objectively regulated as with Apparatus T.

(5) Other mental processes, chiefly kinaesthesis (naming groups or figures), accompanied the perception of the groups and formed part of the learning processes.

(6) The following factors played an important rôle in the

reproduction—visual imagery, eye-kinaesthesis (and hand-kinaesthesis for *F*), verbal kinaesthesis.

(7) In Experimental Series II the mental processes concerned in learning a pattern were quite the same as in Series I, except that the mid-period here gave no chance for a change of attention during the total exposure-time. Two of the subjects continued the learning after the momentary exposures by shifting attention to the memory after-image of the group just fixated. This additional period of learning would correspond fairly well with the intervals between exposures in Series I with Apparatus T, which were used in a similar way.

Conclusion.

All of our results seem to justify us in the use of Whipple's tachistoscope[9] for McDougall's "spot-pattern" test. And, further, we are inclined to think that where the McDougall's portable tachistoscope is used for the test, a somewhat more accurate rating of the subject—at least with adults—can be obtained by giving him a chance to reproduce the pattern after each momentary exposure.

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(2) C. Burt and R. C. Moore. *The Mental Differences Between the Sexes.* Jour. of Exp. Ped., 1: 1912, 273-284, 355-388.

(3) W. McDougall. *Physiological Psychology.* London, 2d. ed., 1908, especially 129 ff.

(4) E. Schuster. *First Results from the Oxford Anthropometric Laboratory.* Biometrika, 8: 1911, 40-51.

(5) G. M. Whipple. *Manual of Mental and Physical Tests.* Baltimore, Part I, 2d ed., 1914, 290-296.

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[9]Since the completion of these experiments Professor Whipple has devised a portable tachistoscope, which gives satisfactory results for the McDougall 'spot-pattern' test (5, 293 f.).

THE TRAINING OF JUDGMENT IN THE USE OF THE AYRES SCALE FOR HANDWRITING.

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(*Contributions from the University of Texas Educational Laboratory, No. 6.*)

Introductory.

Judgment is a form of mental activity which plays an important part in the daily work of the teacher, but as yet educational psychology has scarcely begun the extensive investigations which are called for in this field. One small phase of the subject, the judgments shown in grading the work of pupils, has been studied to some extent, but the work done thus far has only dealt with results. No attempt has been made to study the mental processes involved in such judgments. The elements which enter into them, the criteria upon which they are based and the conditions which make for variability in them are problems which need careful consideration.

One factor which no doubt will help to reduce the variability of judgment in grading is the introduction of scales for measuring handwriting, composition, drawing and spelling. Nevertheless, it is desirable to have a careful analysis of the mental processes involved in their use and a determination of the conditions under which they give the most reliable results.

To study some phases of these mental processes and to test experimentally one plan for procuring better results in the use of scales is the general problem of the following investigation.

Experimental.

King and Johnson,[1] and Pintner[2] have called attention to the fact that there is considerable variability in results when more than one judge use a scale in grading samples of handwriting. Mr. Manuel of the University of Chicago in some unpublished results of an investigation in the use of the Ayres scale by students of education, writing supervisors and others comes to the rather discouraging conclusion that it is impossible to get reliable results in such work. The question raised and partially answered by this investigation has to do with the effect of a period of practice upon the variability in grading handwriting by means of the Ayres scale.

It is a notable fact that most of the work which has been done in grading has emphasized its unreliability, but no positive contributions for remedying this defect have been offered, except the use of the distribution curve. One type of judgment closely related to the grading of the teacher is the scoring done by agriculturists. Variability in this judging is reduced to a minimum by means of a long period of training in the use of score cards. This suggests that much of the grading done by the teacher may be of such nature that training will materially affect the results.

The experiment to be described was begun the second week of January, 1914, and continued for twenty weeks. The training was concluded at this time on account of the close of the university year. It is not intended to propose this length of time as a standard for such training. The results show that with this group of judges the training was not complete. However, it is the opinion of the author that with a better technique the same degree of expertness could be attained in a shorter period of training.

The judges who took part in the experiment were three

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[1] *The Writing Abilities of the Elementary and Grammar School Pupils of a City School System Measured by the Ayres Scale.* Journal of Educational Psychology, Vol. III, 514-520.

[2] *A Comparison of the Ayres and Thorndike Handwriting Scales.* Journal of Educational Psychology, November, 1914.

students[3] of education who were selected because of their reliable class work. None of them had had any experience in the use of a scale or in other experimental work, but they entered into the spirit of the experiment and gave it their best efforts. They had had no experience in teaching, and so had no established habits of grading. It would be very interesting to know just what kinds of mental activities and temperaments lend themselves most readily to the type of training employed in this experiment. Evidently there are certain factors which make for progress which it would be well to know when such work is undertaken.

The samples of writing used were taken from the written work of both children and adults. None of the samples was prepared especially for the experiment, but all were taken from the written exercises in language, geography, etc. Twenty-five samples were used each week, and with two exceptions (see seventh and eighth weeks in Table 1) different samples were used each time. Table 1 shows the different types of writing used during the experiment.

TABLE 1.

Week.	Sample.
1	Adult writing.
2	Adult writing.
3	Third grade writing.
4	Fourth grade writing.
5	Third and fourth grades, and adult writing.
6	Second grade writing.
7	Same as third week.
8	Same as fourth week.
9	Seventh grade writing.
10	Fifth grade writing.
11	Second grade writing.
12	Fifth grade writing.
13	Sixth grade and adult writing.
14	Fifth grade writing.
15	First grade writing.
16	Third grade writing.
17	Fourth grade writing.
18	Third and fourth grade writing.
19	Second grade writing.
20	First grade writing.

At the close of the twentieth week five hundred additional

[3]The author is very much indebted to Miss Louise Garrison, Miss Pollie Hart and Miss Mary Andrews for the faithful work that has made this article possible.

samples were graded. These were collected, for the most part, from the elementary grades, but a few specimens from adults were included. With a few exceptions, these samples were written in the university laboratory at the direction of the author under careful supervision as a part of another experiment. In the subsequent discussion it will appear that the above fact seems to have materially affected the results of this experiment.

Little attention was given to the selection of the samples to be used each week, because it was thought that one sample was as good as another to give practice in the use of the scale. The results of the experiment show that this method of procedure is not desirable, for there were very few samples in the entire group which received high grades, and, therefore, the judges had little practice in the use of the upper portion of the scale. In the grades for the five hundred samples already mentioned the greatest variability is shown in those samples which are graded high. This is evidently due to the lack of practice in the use of the high values on the scale. The experience gained in conducting the experiment indicates that one of the most important things in the entire technique of such training is the selection of the writing used. A wide range of samples should be selected, so as to require the use of most of the grades on the scale each time that a number of samples is graded.

The preliminary directions consisted of a brief outline of the proposed experiment and a short discussion of the Ayres scale, with careful directions for its use. It was made plain to the judges that they could not only give those grades appearing on the scale, but if they thought a sample fell between samples given on the scale, they should give it an appropriate value or grade. They were also instructed to evaluate the style of each sample by using A, B or C as provided in the scale.

The general plan followed was to have each of three judges grade twenty-five samples of handwriting independently, and to follow this independent grading by a conference with the author each Friday for the purpose of comparing their grades and discussing their difficulties. Some of the notes on the

conferences are given below. The experiment was undertaken with the idea of determining the effect of the practice in an objective manner rather than by an analysis of the subjective process, and as a result few notes were kept, and the account given is somewhat meager. The results of the present experiment lead the author to think that a much more detailed account of the mental processes involved would be of value, and such work is planned for the future.

In the first conference the samples on which there was a large variation were considered. Such questions as, Is this sample peculiar in any way? Was it difficult to grade? Did you feel sure of your grade? were asked the judges. The point of value which came out of these considerations was that sometimes these samples were those upon which one or more of the judges had spent some time in deciding upon the grade. Further discussion will show the importance of this point. It might also be added that the consideration of these samples in the conferences usually failed to bring about any closer agreement on the grading.

At this first conference the judges were asked to grade themselves on the degree of certainty which they felt when they graded a sample. The following scale was used: (1) very sure, (2) sure, (3) slightly doubtful, (4) doubtful, (5) very doubtful, (6) do not know, a guess. The purpose in this was to see if a high degree of uncertainty accompanied lack of agreement in grades. It was thought that if such results were found, they might give a basis for future work, but no such agreement was discovered. Many times the degree of certainty was high for each judge when there was a high degree of variation. One interesting thing is that, while each judge began this part of the experiment by using 2, 3 and 4 for grading themselves, two of them soon began to use 1 and 2 most of the time, while the third judge seldom used 1. It may be added here that the results for the designation of the style by A, B and C resulted in much the same way, *i. e.*, no relation could be seen to exist between judgments on style and judgments on grades. Sometimes there was agreement in both grades and style, or maybe in style and not in grades, or possibly agreement in neither. As the experiment pro-

ceeded, however, the agreement in the grades on style became greater. Neither of these plans seemed to help reduce the variations in grading, and both were discontinued in the latter part of the experiment.

The results for the first week showed that one judge was grading lower than the other two. It was suggested that she be a little more liberal in her grades. The next week her grades were higher than those of the other judges. The fourth week this variation was reduced somewhat, and in the results for the tenth week the averages were very close together. At the end of the second week it was noted that when a specimen of writing fell between any two samples on the scale one judge arrived at her grade by subtracting a certain number of points from the grade above, while the other judges arrived at their grades by adding a certain number of points to the grade below; for instance, if all gave the grade 35 for some sample, the grade meant five better than 30 for two of them and five less than 40 for the remaining one. It was thought that this might be a source of variation, and the one was asked to make her method parallel that of the other two.

At the third conference one of the judges suggested a difference in samples which furnished a basis for most of the work in the future conferences. Briefly, this difference is that certain samples are such that the first general impression of them does not change or fluctuate, while other samples are such that the first judgment changes. The second impression may be that the sample is either better or worse than the first impression indicated. This second judgment would prevail for such samples, but the fluctuation in the judgment made the grading more difficult than in the case above. Still other samples were such that general impressions could not be relied upon, and a somewhat detailed examination was necessary.

An attempt was made to study these different types of samples by objective methods, but little progress was made, because a sample which belonged in one group for one judge might belong in another group for the others. A further analysis of the mental activity involved in the judgment of the different kinds of writing revealed that each sample was

evaluated by some of its elements, as slant, formation of letters, size, legibility, etc. That is, one or more of these elements stood out prominently in the mind of the judge and confirmed or changed the first general impression. This seems to indicate that, while the general impression is one of the chief things relied upon in such grading, this general impression must have some check in a more detailed study. With certain samples this confirmation comes immediately; in others, the first impression is changed, but the second is confirmed, while in still others there is a great deal of fluctuation before any confirmation comes, and sometimes there would be a lack of confirmation, which was shown by the judge saying, "I do not know what I think of that sample."

The next step in the process was to find a specimen on the scale which was most like the writing to be graded. This involved comparisons which, according to the introspections of the judges, required that they have in mind the general impressions of both the sample on the scale and the sample to be graded. The introspections also showed that the judges did not depend upon these general impressions alone, but that they also looked for details of slant, spacing, etc., *i. e.*, the likeness of the two samples was not fully established by means of the general impressions, but must be confirmed by certain details.

Again, there seemed to be three different types of writing. First, those for which the first comparison gave results satisfactory to the judge. Second, those for which two or three trials were necessary, and third, those for which many trials were required before the comparison gave a satisfactory result. In the last case the result was recorded many times as a guess. Practice increased very greatly the number of comparisons which gave satisfactory results on the first attempt. It may be added that the same difficulties in arriving at correct general impressions for the samples on the scale were encountered, as in the case of the writing to be graded. This made the constant use of the scale necessary at first, but as the experiment proceeded memory was more and more depended upon, until finally the printed copy of the scale was used only for reference. It was the opinion of the judges

that one of the principal points in the training was in becoming thoroughly familiar with the scale.

For the next step in the procedure the judges were asked to make out a list of the points which they were using to check their general impressions. There was great similarity in the three lists, and from them the following list was made and given to each judge:

Letter formation poor.
Execution poor.
Slant mixed.
Indistinct.
Letters separated.
Not neat.
Not on the line.
Too small.
Easy to read.

They were then asked to characterize each sample with some one of these terms and record this along with their grades. These results showed that they did not use the same points to confirm their general impressions. The lack of unanimity in these reports did not decrease, but the grades soon began to show less variation. This certainly indicates that the essential thing in the grading is not the particular points used for the confirmation of the general impression. A second thought shows that this is true, because if a sample is good, then correct spacing, neatness, etc., are likely to be highly correlated with it, and so the general impression may be confirmed by any one of several points. This leaves the general impression as one of the most important elements in the judging. This seems to be borne out by the fact that in a large majority of cases there was unanimity in the general impressions.

To summarize, there are three distinct mental steps in the evaluation of writing by a scale. First, the forming of a general impression of the writing to be graded. Second, the forming of a general impression of a sample on the scale, and third, the comparison of the writing on the scale with the writing to be graded. The training, then, is a twofold one, in that it aids in getting a correct general impression and in making accurate comparisons.

These two elements, general impression and comparison, which enter into the evaluation of a sample of writing by means of the scale correspond closely to the results obtained by Hollingsworth.[4] Further work with respect to the same points should be undertaken in order to give a detailed account of the effect of practice upon both of them.

Numerical Results.

Table 2 gives the grades for the first, tenth and twentieth weeks. The digits at the left indicate the number of the sample, while the letters at the top designate the judges.

Table 2.

	First Week.			Tenth Week.			Twentieth Week.		
	A.	H.	G.	A.	H.	G.	A.	H.	G.
1....	48	30	30	50	65	65	40	40	37
2....	23	30	70	42	40	47	40	43	37
3....	58	60	70	57	80	73	37	37	37
4....	53	80	35	43	57	43	35	35	35
5....	20	35	48	40	35	43	37	30	37
6....	30	75	30	40	35	33	40	35	35
7....	30	35	60	43	37	56	40	40	37
8....	55	40	50	45	33	37	37	35	33
9....	50	40	60	43	35	47	35	35	37
10....	45	40	40	45	35	37	37	35	37
11....	35	25	40	60	57	59	37	33	35
12....	40	35	40	57	57	47	37	37	37
13....	60	70	50	43	37	47	40	33	35
14....	50	50	50	67	80	83	37	40	35
15....	43	60	60	45	37	40	40	40	37
16....	44	80	77	47	35	57	37	37	35
17....	30	35	60	50	35	33	37	40	35
18....	45	60	60	47	77	67	37	35	35
19....	50	75	58	40	40	37	40	35	37
20....	50	60	68	40	45	57	35	37	35
21....	25	35	40	54	43	40	37	33	37
22....	60	78	60	43	35	47	37	35	35
23....	35	40	35	54	80	67	37	43	40
24....	58	45	45	43	43	53	37	35	37
25....	60	75	70	40	40	43	40	40	40
Av.	43.8	51.5	52.2	47.1	47.7	50.3	37.7	36.7	36.2

To show the variability in a more convenient form, the range of the grades for each sample was calculated. As the

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[4] *Experimental Studies in Judgment.* Archives of Psychology, No. 29, December, 1913, chapter 7.

term range is here used it means the difference between the highest and the lowest grade given for the same sample. To illustrate: The highest grade for sample one in the first week above is 48, and the lowest grade is 30. The range is found by taking the difference between these two. Table 3 gives the range for each sample for the first, fifth, tenth, fifteenth and twentieth weeks.

TABLE 3.

	1st Week.	5th Week.	10th Week.	15th Week.	20th Week.
1	18	7	15	2	3
2	47	3	7	4	6
3	12	10	23	2	0
4	45	10	14	2	0
5	28	7	8	2	7
6	45	10	7	3	5
7	30	8	19	0	3
8	15	13	12	1	4
9	20	7	12	0	2
10	5	10	10	7	2
11	15	15	3	5	4
12	5	10	10	2	0
13	20	37	10	7	7
14	0	5	16	5	5
15	17	2	8	1	3
16	36	24	22	2	2
17	30	17	17	9	5
18	15	7	30	1	2
19	25	30	3	11	5
20	18	15	17	5	2
21	15	8	14	8	4
22	18	16	12	3	2
23	5	10	26	7	6
24	13	5	10	3	2
25	15	33	13	0	0
Average	20.4	12.7	13.5	3.6	3.2

At the end of the twentieth week the five hundred samples mentioned before were graded. This grading was done at two sittings, and, while the samples were graded carefully, the work was carried on under some pressure and not without the element of fatigue entering into it. In fact, it was hoped that the same conditions might prevail here as would exist where experts were grading a large number of samples in an elaborate study of handwriting. Table 4 gives results for two half grades.

In table 2 attention is called to the fact that for the first week there is a rather high variation in the average grades

TABLE 4.

	6 A Boys.					6 A Girls.			
Sample.	A.	G.	H.	Range.	Sample.	A.	G.	H.	Range.
1.....	37	33	33	4	1.....	35	37	37	2
2.....	37	30	30	7	2.....	37	33	35	4
3.....	37	53	40	16	3.....	25	35	33	10
4.....	35	37	33	4	4.....	27	37	37	10
5.....	37	37	37	0	5.....	25	30	33	8
6.....	33	40	43	10	6.....	33	33	35	2
7.....	33	33	35	2	7.....	30	33	33	3
8.....	35	37	37	2	8.....	35	33	40	7
9.....	33	37	40	7	9.....	35	35	33	2
10.....	31	40	37	9	10.....	37	37	35	2
11.....	37	40	37	3	11.....	33	40	45	12
12.....	27	33	35	8	12.....	30	35	30	5
13.....	37	37	40	3	13.....	37	35	37	2
14.....	40	37	35	5	14.....	37	37	37	0
15.....	37	37	37	0	15.....	40	35	40	5
16.....	27	35	30	8	16.....	27	35	30	8
17.....	27	35	33	8	17.....	35	35	35	0
18.....	35	30	35	5	18.....	37	35	37	2
19.....	35	35	33	2	19.....	37	35	30	7
20.....	35	35	40	5	20.....	35	37	33	4
21.....	43	37	43	6	21.....	43	35	37	8
Average...	34.6	36.5	36.3	5.3	Average...	33.8	35	35.3	4.9

given by the different judges. This variation is reduced very much in the results of both the tenth and twentieth weeks. Attention is also called to the fact that there is much less variation in the grades given for each sample in the results of the tenth week than in the results for the first week, and still less variation in the grades of the twentieth week. It may be argued that the absence of variation in the last results is due to the fact that there is little variation in quality, so that the grading is much easier. That it is not altogether due to this is shown by the fact that if the variation of the grades of the samples of the first week for which the grades run above 50 is calculated and the variation for those below 50 is also calculated, *i. e.*, calculating the variation for two groups varying equally in quality, the results show that the variation is nearly the same in each group, and each separate variation is about the same as the variation for the total group.

In the results for the tenth week the range in quality is only a little less than in the first week, and yet the variability of these grades is reduced about 50 per cent. (See Table 2.) The results for the five hundred samples mentioned before

range in quality from 20 to 80. This grading was all done at two sittings, and the samples were taken in a very miscellaneous order, yet the variation for most of the school grades is only a little higher than in the results for the latter weeks of the training period. Another interesting point is that the greatest variation occurred in the use of the high grades of the scale, where there had been little practice. If range in quality produces variation in grades, there ought to be as much variation among the low grades as in the high grades.

Table 4 also shows a small range in quality. This is typical of all the results from the five hundred samples except those for the adults. It was first thought that this might be due to some unknown factor in the practice, but further consideration showed that it was probably due to the samples of writing themselves. An examination of the samples for the twentieth week which were written by first-grade children shows that there is little difference in quality in the samples, and either they have been selected by the teacher or the class was not widely distributed in ability. When the five hundred samples are considered, the fact that there is wide range of quality (30-80) in the grades for the adults and only a comparatively small range of quality in the writing of the different school grades leads to the view that some factor has entered into the writing of the children which makes for uniformity in quality. Another fact which leads to the same view is that the range of quality for the different grades is from 29.6 to 36.4 for the boys and 28.5 to 38 for the girls. These results are very close to some of the grades given by King and Johnson. It is possible that the small range in quality is due to the fact that the children's writing was all done under controlled conditions, as mentioned before, while very few of the adult samples were so written.

Conclusions and Suggestions.

1. Accuracy in grading writing by a scale may be produced by careful training in the use of the scale. In the past the assumption has been made that the ability to grade expertly in a subject came with an expert knowledge of the subject. While the experiment does not disprove this assumption, it indicates clearly that another avenue of approach to such

expert ability is through a period of careful training. This implies that grading may be considered a field more or less by itself, and gives a glimpse of a type of work in education whose chief interest is the accurate use of units of measurement. To illustrate: In the subject of writing such a field would have its chief interest in the expert application of standardized units for measuring writing rather than in the psychology or pedagogy of the subject.

2. The experiment suggests a field in which Normal Schools and Departments of Education may well afford to give training.

3. It is certainly within the range of possibility for any medium-sized system of schools to have within its teaching force a few teachers who have been carefully trained in the measurement of handwriting or other subjects. One objection made by teachers to grading by means of scales is that no two persons get the same results. One must admit that this objection has some merit, but grading by teachers trained until their range of variation has reached a minimum would certainly beget the respect of all concerned, and would give an excellent basis for the establishment of norms and comparisons of schools, grades and teachers. Such work would also establish many of the favorable and unfavorable points concerning a system of schools upon such a basis that there would be no denying them.

4. The objection may be offered that the whole scheme is impracticable because of the long period of training required. Two replies suggest themselves to this. First, the period of training in the experiment is not so long as that required in some agricultural courses. Second, it is quite possible that when a technique is worked out for the training period the length of the time for practice will be materially reduced.

For those who wish to attempt work of this kind the following suggestions in regard to technique are offered:

1. At the beginning of the experiment twenty-five samples should be used at each sitting. Two periods for each week, with a two days' interval between the grading, are probably better than a single period. The number of samples at each sitting may be increased as the time for grading is reduced.

2. The samples should be selected very carefully, so that each set requires the use of the entire compass of the scale.

3. The use of the scale should be carefully explained. The judges should be encouraged to make a detailed study of it, and to become so familiar with it that the printed copy need be used only for reference.

4. The elements of good writing, such as slant, spacing, etc., should be discussed with the judges and a list of these elements given to each.

5. The judges should be encouraged to depend upon the general impression of the sample in making their comparison with the scale.

6. Conferences should be held at least once a week for discussions of difficulties and comparisons of results.

7. If the person conducting the training is an expert in the use of the scale, he should check the results of the pupils in training with his own judgments. Such checking of results, supplemented by discussions of the errors made, would certainly be a decided advantage. It may be mentioned that in the training given in agricultural courses this is considered most important.

ARTICULATION AND ASSOCIATION.

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In performing tests or experiments on free or controlled association questions always arise concerning the relation between the reading and articulation time of an observer, on the one hand, and his association time as shown by the records, on the other. Thus observers frequently complain that their associations really come more quickly than the records show, but that their speech organs will not act quickly or rapidly enough to keep up with the associations. It is not only in free association that this happens, but it is also a common occurrence when the test is one of controlled association between stimulus word and response. In "opposites" tests, for example, observers quite uniformly assert that the proper words, when stimuli are presented in series, are delayed by the necessary slowness of articulation. There is a common feeling on the part of these observers that the opposites are given as rapidly as they could be read from a printed list.

Professor Whipple has remarked this tendency in his discussion of the speed of reading complicated prose (*Manual of Mental and Physical Tests,* 1st ed., p. 276). "Adults who try the test are almost unanimous in their declaration that their speed in reading is not conditioned by the task of assimilating the substance of the text, but solely by the physiological limit to intelligible articulation: their speed in reading the reversed text, however, is quite obviously not conditioned by speed of articulation, but by a sort of 'linguistic readiness,' or ease of apperceiving the constituent words of the text."

Another frequent assertion, when there is any competition between different observers, is that they differ only in reading and articulation time, and that their associations are equally prompt. Another statement often made is that women are

speedier in linguistic tests, and that perhaps this difference is due to more rapid reading and articulation.

On the first of these points Whipple, in the section already referred to, remarks, "If these statements are correct, we are evidently driven to the conclusion that persons who read difficult and complicated subject-matter rapidly also tend to speak more rapidly—a conclusion that subsidiary tests appear to confirm. It is, furthermore, not unlikely that fast readers are also fast thinkers as well as fast speakers, though this generalization has at present no experimental verification."

On the question of differences between men and women, Cohn and Dieffenbacher (Beihefte Zeits. Angew. Psychol., 1911, 2, 50) report that in all the school grades tested in their research the female subjects read more rapidly than the males. Professor Whipple writes me that he has made the same observation, and that the new edition of his *Manual* is to contain a special comment on this point.

With these various things in mind, along with certain other questions, I have put 19 observers (11 men and 8 women) through 100 trials of the familiar Color Naming Test and the same number of trials of the Opposites test described in earlier articles. The observers were chosen at random from college or graduate students. The men were all actively engaged in scholastic or literary work, while five of the women had been keeping house for several years since their graduation from college. They ranged in age from 18 to 35 years.

The procedure was as follows: Each individual went through the tests 100 times, in periods varying from 10 to 40 days. The time of each trial was taken in fifth-seconds, with a stop-watch. After the 100 trials each individual was given a sheet on which was typewritten, in the case of the Color Naming Test, the names of the colors, in the order and arrangement in which the colors themselves had appeared on the chart; in the case of the Opposites test, the actual opposites which the individual had customarily given, arranged in the order in which they might have occurred in an actual test. He was allowed to read these lists aloud, as rapidly as possible, on five different occasions, and the reading and articulation time was recorded in fifth-seconds.

The original test records were now referred to, and for each observer two averages were found, hereafter designated *initial* and *final* average. The initial average is the average of the first five trials after a single preliminary trial. The final average is the average of the last five of the 100 trials.

With this material at hand light may be thrown on various of the foregoing questions. Table I gives the three records for each observer in both tests, and also the averages. The detailed problems will be taken up in turn, on the basis of special tables and computations derived from this main table.

1. *Correlation of Reading Rates.* With respect to individual differences in speed of reading aloud, the various observers are consistent in the two tests (Color Naming and Opposites). When the 19 individuals are arranged in order of relative position in the two cases there is a correlation of .93 between the two orders. It would, of course, be surprising if this were not so.

TABLE 1.

Reading-articulation and Association Times.*

	Color Naming.			Naming Opposites.		
	Reading Colors Aloud.		Reading Color Names	Reading Opposites Aloud.		Reading Words
Obs.	Initial.	Final.	Aloud.	Initial.	Final.	Aloud.
M1	40.3	27.6	23.0	46.9	30.0	13.6
F1	44.8	27.0	20.9	63.8	24.7	13.6
F2	45.9	30.4	19.5	33.0	23.4	14.4
F3	60.6	39.6	28.4	143.0	33.1	16.5
F4	47.1	37.0	26.4	63.8	20.9	13.1
M2	55.0	39.0	26.7	70.9	32.0	13.5
M3	127.8	67.4	39.8	102.8	44.2	22.6
F5	65.2	58.6	29.4	122.8	36.0	17.4
M4	57.8	44.0	32.4	97.0	32.4	18.2
F6	62.6	35.2	29.0	70.4	25.2	18.4
M5	58.8	38.8	28.8	85.6	27.6	16.8
M6	85.6	51.8	32.4	148.4	45.0	18.4
M7	82.0	46.2	37.4	175.4	39.2	21.2
M8	105.4	65.6	42.0	112.6	48.0	21.6
F7	60.6	55.6	32.0	61.2	34.9	18.6
M9	54.8	42.2	31.0	83.8	32.2	18.5
M10	77.4	58.0	33.4	98.2	33.6	18.6
M11	100.4	57.8	38.2	357.2	35.0	20.2
F8	88.4	67.6	29.0	239.6	51.4	16.6
Averages.	69.7	48.9	30.5	107.7	34.1	17.5

*By "reading-articulation" or simply "articulation" time is meant the time required to read aloud the color names or the correct opposites when they are presented in printed form.

Correlations.

Two Articulation times	.93
Initial Colors and Articulation	.84
Final Colors and Articulation	.75
Initial Opposites and Articulation	.53
Final Opposites and Articulation	.64
Initial Colors and Opposites	.79
Final Colors and Opposites	.91

Average Times, Men and Women.

	Articulation.		Colors.		Opposites.	
	Colors.	Opposites.	Initial.	Final.	Initial.	Final.
Men	33.2	18.5	77.1	49.0	113.5	36.3
Women	26.8	16.1	59.4	43.9	99.7	31.2

Average Positions Occupied by Men and Women.

	Articulation.		Color Naming.		Opposites.	
	Colors.	Opposites.	Final.	Initial.	Final.	Initial.
Men	12.5	12.2	11.1	11.0	11.3	11.3
Women	6.5	7.0	8.4	8.6	8.3	8.1

2. *Reading Rate and Association Times.* There is fairly high correlation between the orders for reading rate and the orders for association time in the actual tests. This correlation is much higher in the case of Color Naming than in the case of Opposites. The average correlation between reading rate and initial time is exactly the same as the average correlation between reading rate and final time. The final average correlation between reading and association times is .69. The figures are as follows:

	Initial.	Final.	Average.
Reading color names and naming colors	.84	.75	.80
Reading words and naming opposites	.53	.64	.59
Averages	.69	.69	.69

These facts throw interesting light on the nature of the difficulties in the two tests. Articulation counts for more in Color Naming than in Opposites, and it is a matter of common observation that in the Color Naming test there is great difficulty in enunciating the intended words properly. If the card bears such colors as red, blue, black, green, yellow, such expressions as "brack", "rellow", "bleen", etc., are frequent. The body of the word may show by its correctness that the color is properly recognized, but various perseverations, in-

hibitions and interferences seem to muddle the articulation. In the Opposites test such expressions are not at all frequent. The mistakes of enunciation take the form rather of repetition of the stimulus word or of a preceding or following stimulus word or opposite. The difficulty is apparently not so much in the process of articulation as in the associative mechanism itself.

3. There is *a fairly high correlation of ability* in the two association tests, and this correlation, as is always the case, is greater after practice than before. The initial correlation is .79. The final correlation is .91. This gives an average correlation of at least .85 between Color Naming and Opposites.

4. *Comparison of Reading Time with Association Time.* On the average, the association time, in the test, is about twice as long as the reading and articulation time, but in the Opposites test this relation is not found except when the final time is considered. The initial time here is some six times as long as the reading and articulation time. That is, even in the beginning the speed of naming colors shows closer approximation to the speed of reading color names than does the speed of naming opposites to the time of reading them. Both in initial and final trials the difference between association time and reading-articulation time is greater in Opposites than in Color Naming. The figures are as follows:

Averages of	Reading and Articulation.	Initial Assoc.	Final Assoc.
Colors	30.5 sec.	69.7	48.9
Opposites	17.5	107.7	34.1

5. *Association Time Not Solely Conditioned by Articulation and Reading Time.* It is apparent, since the association times do not at all approach the limits set by articulation-reading time, that a considerable time is required for the associative mechanism itself. Since there is, on the average, only 70 per cent. correlation between reading-articulation and association times, it follows that individuals differ markedly in the speed of the associative mechanism itself. No individual fails to show a large difference between test time and reading time. Nor would they so fail if allowed to practice longer.

As I have elsewhere shown, the practice limit in Color Naming is reached by about the tenth trial, and in Opposites by about the seventy-fifth trial. The present experiment, it will be remembered, included 100 trials. It is furthermore true that the two tests show higher correlation with each other than they do with their own reading-articulation times. In other words, ability in one test is better indicated by ability in the other test than by ability to read and articulate. All of these things show that such individual differences as are found are not at all "merely a matter of articulation."

6. *Sex Differences.* It would be hazardous, indeed, to make final statements as to general sex differences on the basis of so few observers. Nevertheless, such differences as prevail between the 11 men and the 8 women of the present experiment are so striking as to be extremely suggestive, and confirm the reports of Whipple and of Cohn and Dieffenbacher. The women are clearly quicker, both in association time and in reading and articulation time. The difference, from the point of view of the averages, is greater in the latter than in the former, and about the same in Color Naming as in Opposites. The averages are as follows:

	Reading.		Color Naming.		Opposites.	
	Colors.	Opposites.	Initial.	Final.	Initial.	Final.
Women	26.8	16.1	59.4	43.9	99.7	31.2
Men	33.2	18.5	77.1	49.0	113.5	36.3

The superiority of the women is clearly indicated by the following tabulation, which shows the distribution of the individual records among the 19 places in the series. All three time measurements are included in this table. It should be remembered that since there were but 8 women, while there were 11 men, the latter stand about one-third more chances of being found in the higher positions. The actual ratio of the numbers of the two sexes is, men to women, 1.37 to 1. Any ratio less than this will show superiority on the part of the women. In the second column for the women the actual numbers, multiplied by this ratio, are given, and designated corrected number. They indicate the probable number if there had been 11 women.

Positions.	Number of Men.	Number of Women.	Corrected Number of Women.	Ratio of Men to Women.	Corrected Ratio.
1 to 4	6	18	24.7	.33	.24
5 to 9	18	12	16.4	1.50	1.09
10 to 14	18	12	16.4	1.50	1.09
15 to 19	24	6	8.2	4.00	2.93

The average position occupied by the women is, in reading time, about 6 places, and in Color Naming and Association, about 3 places, higher than the average position occupied by the men.

That is to say, the chances are 4 to 1 that a woman rather than a man will occupy a given place in the first four positions if equal numbers of each compete. The chances are 3 to 1 that a man will be found occupying a given place in the last five positions under the same circumstances. In the middle 10 positions the men and women will be found in equal numbers. These results are found in the present experiment in spite of the fact that the men were actually engaged at the time in scholastic and literary pursuits, while all but three of the women were engaged mainly in housework, and had been for some time so engaged.

THE MEASUREMENT OF EFFICIENCY IN WRITING.

DANIEL STARCH,
University of Wisconsin.

Essential Elements in Writing. In measuring the efficiency of writing it is necessary to ascertain the essential constituents in the process. A simple analysis of handwriting shows that its chief elements are the legibility, speed and form, or appearance. However, the first and third, legibility and form, are so closely correlated that for practical purposes of measuring the efficiency of writing these two may be regarded as one. This leaves only two prime elements, namely, speed and quality, which need to be measured in order to determine a person's writing capacity.

Other characteristics, such as individuality, size, style, slant, etc., are of little or no importance from the practical viewpoint of writing as a means of communication, except in so far as they are factors in speed, quality or legibility.

Methods of Measuring. The speed of writing may be measured rather easily by ascertaining the amount that can be written in a given period of time, let us say, the number of letters per minute.

The quality of writing can be measured by either the Thorndike or the Ayres scale. The nature and derivation of these scales are described in the original sources. The Thorndike scale was constructed from 1000 samples of writing, furnished by pupils in school. These samples were arranged in the order of merit by forty or more competent judges. This resulted in a scale of graded specimens ranging in quality from 0 to 18, the former being absolutely illegible writing, but recognizable as writing, and the latter being a perfect copybook model. A given specimen of writing is measured by putting it alongside the scale and determining to what quality it is nearest.

The Ayres scale was constructed by measuring the speed of reading 1578 samples of children's writing. The words in these samples were thrown out of their natural context. These specimens were then read by ten different persons, and an

average reading time was computed for each sample. Typical specimens were selected from the entire group, so as to represent eight degrees of legibility. The scale in its final form consists of three samples, slant, medium and vertical, for each of the eight degrees of legibility. The steps are designated as 20, 30, 40, 50, 60, 70, 80 and 90. Measurements are made in the same manner as with the Thorndike scale.

The convenience and accuracy of making measurements with either scale are practically the same. To test their relative usefulness as compared with each other and as compared with the ordinary estimates of writing made on the percentage basis, fifteen samples of children's writing were measured by twenty competent persons in three ways: (1) by the Thorndike scale, (2) by the Ayres scale and (3) by the ordinary percentile method. The results showed that the measurements made by either scale were of almost identical accuracy, and that both were very much more accurate than the estimates made by the usual percentile plan.[1]

In the measurements to be reported presently the Thorndike scale was used, and all values are expressed in terms of its units. However, any measurements made by the Ayres scale can be directly compared with those made by the Thorndike scale, according to the following equivalent values. These values are derived from the above investigation, in which fifteen samples were measured by twenty persons by the use of both scales:

Writing sample No.	Value according to Thorndike scale.	Value according to Ayres scale.
15	7.1	22
12	8.25	33
3	8.45	30
11	8.75	37.1
9	9.05	39.5
13	9.3	41
7	9.5	41.5
14	9.65	47.5
8	9.9	50
1	10	48
5	10.1	52
2	11.25	58
10	11.35	59
6	11.7	60.5
4	12.6	71

[1]A full account of this test is given in an article by the author, Journal of Educational Psychology, IV, 1913, p. 454.

From these values it will be found that within the limits of these qualities one step on the Thorndike scale is equivalent to 8.9 points on the Ayres scale, and hence we obtain the following equations:

Thorndike scale.		Ayres scale.
Quality 7	is equal to	22
" 8	" "	" 31
" 9	" "	" 40
" 10	" "	" 49
" 11	" "	" 58
" 12	" "	" 67
" 13	" "	" 76
" 14	" "	" 85

The Thorndike scale was used in preference to the Ayres scale in the measurements to be reported on later pages mainly because the Ayres scale does not extend as far at the lower and upper limits as the Thorndike scale. The limits of the Ayres scale lie within qualities 7 and 14 on the Thorndike scale. Quite a number of pupils in the upper grades write better than quality 14 and about half of the pupils in the first and second grades write worse than quality 7.

Administering and Scoring of Tests. The directions for making the writing tests are as follows:

> Explain to the pupils that they are to write repeatedly the line "Mary had a little lamb" as well as they can and as rapidly as they can during the two minutes that will be allowed for the writing.
>
> Explain also that they are to write continuously without interruption and to make no erasures or corrections.
>
> The pupils are to write with pen and ink on ruled paper. Before making the test have the pupils write at the top of the sheet the name, grade, school, city, and the date.
>
> When all are ready, have them hold their pens up in the air and then give the signal "start." Allow them exactly two minutes to write over as many times as they can "Mary had a little lamb." Both speed and quality of writing count in this test.
>
> If desired, a different sentence may be used instead of "Mary had a little lamb." The sentence must not contain more than five to seven words, which must all be familiar to the children. The pupils, however, must not have received previous drill upon it. The sentence "Art is long and time is fleeting" has been used.
>
> N. B.—Make sure of allowing exactly two minutes. See that all start and stop at the same time.

The time limit of two minutes is chosen because it is long enough to yield an adequate sample of writing and not too long to produce fatigue. In order to have an adequate test

of speed it is necessary to use something that can be written from memory. Either copying or dictating would interfere with the natural speed of writing.

The samples of writing are then scored for speed and quality. The speed of writing is determined by ascertaining the number of letters written per minute. The quality is measured with the Thorndike scale (or, if preferred, with the Ayres scale,) by what is called the ascending-descending procedure. That is, a group of thirty or forty samples is taken and each one is graded by beginning at the lower end of the scale and ascending until the quality is reached to which the sample is judged equal. After the entire group has been rated in this manner, each sample is judged again by beginning at the upper end of the scale and descending until equivalence is reached. (The examiner should, of course, not know or see what the first measurement was.) The average of these two determinations is taken as the final measurement. It is believed that this method yields considerably more accurate measurements than a single rating does.

Standards of Efficiency in Writing. The writing test as described has been made thus far on 4074 pupils in nineteen schools in eight cities located in three States, Wisconsin, New York and West Virginia. The test was administered and scored according to the conditions outlined. On the basis of these results tentative standard scores of efficiency have been computed for each grade. All tests were made at the end of the school year, so that standards of attainment might be derived which should be reached at the end of the respective grades. These standards, presented in the tables and curves that follow, are not the arithmetical averages of the records obtained in each grade, but they are the smoothed values obtained from these averages. As a matter of fact, these smoothed values deviate only slightly from the actual averages; but it is believed that they approximate more closely to final standards that would be obtained from many more tests in many different communities. Nevertheless, the present standard scores, while they are tentative, probably do not differ very materially from prospective ultimate standards.

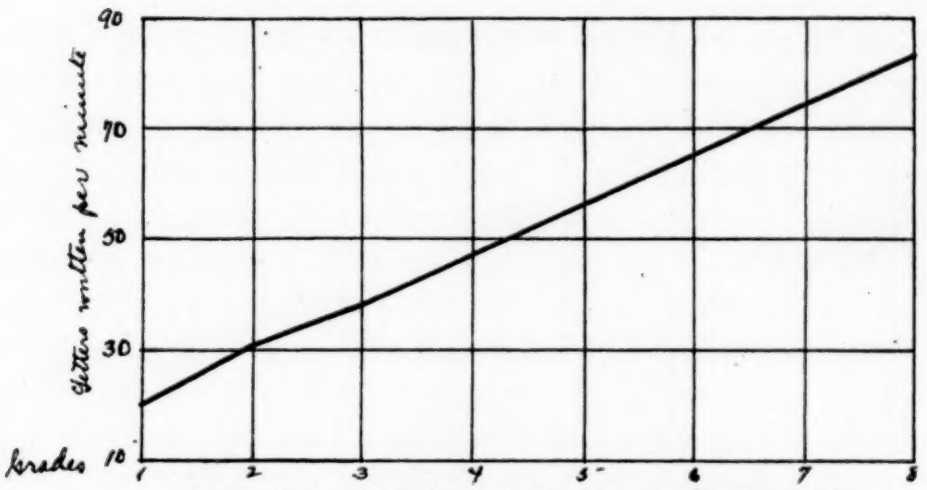

FIGURE 1.—Standard curve for speed of writing.

Standard Scores in Writing.

(Derived from tests made on 4074 pupils.)

Grades	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Speed (letters per minute)	**20**	**31**	**38**	**47**	**57**	**65**	**75**	**83**
Quality (Thorndike scale)	**6.5**	**7.5**	**8.2**	**8.7**	**9.3**	**9.8**	**10.4**	**10.9**

Equivalent standard values for quality on the Ayres scale would be:

27	**33**	**37**	**43**	**47**	**53**	**57**

The following table gives the scores attained by each grade in the nineteen schools tested. The averages given at the bottom are not the arithmetical averages of the numbers given, because some of the schools were very much larger than others and their scores were weighted accordingly, so that the averages represent the actual averages for the total number of pupils tested.

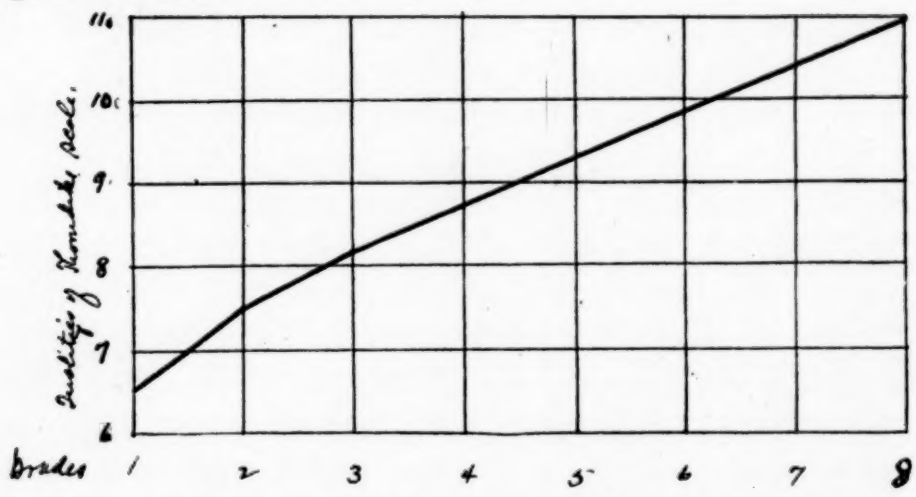

FIGURE 2.—Standard curve for quality of writing.

Speed of Writing.

(Scores made in nineteen schools.)

Grades	1	2	3	4	5	6	7	8
City A, School 1	12.9	31.5	32.9	35.3	39.4	51.8	65.3	84.6
" 2	22.1	30.8	31.7	30.6	43.7	49.7	72.9	90.7
" 3	18.4	21.6	25.5	44.3	44.2	59.6	86.9	86.7
" 4	19.4	40.8	....	36.2	63.9	57.9	82.2	87.3
" 5	16.0	38.0	40.7	47.7	56.0	83.0	81.7	89.6
" 6	14.7	41.7	39.4	40.3	49.8	52.4	80.3	87.6
" 7	21.6	....	....	....	56.0	50.2	....	....
" 8	15.1	25.4	33.8	41.7	42.3	90.2	88.9	79.6
" 9	25.4	33.5	34.9	31.1	55.8	64.4	....	....
" 10	27.5	34.4	33.6	54.3	55.4	57.2	76.7	72.0
City B, 3 Schools	....	24.1	39.1	39.2	58.5	60.6	48.1	69.0
City C, School 1	....	27.0	36.0	45.4	63.0	63.0	72.1	85.5
City D, School 1	....	....	36.4	42.2	41.0	46.1	74.3	73.9
City E, School 1	....	38.6	49.6	66.6	84.1	85.6	97.0	78.0
City F, School 1	....	39.1	53.1	63.6	65.2	....	85.7	83.0
City G, School 1	20.9	35.3	50.1	69.1	75.4	77.2	85.1	93.0
City H, School 1	18.0	40.0	68.0	76.0	83.0	85.0	86.0	86.0
Averages	19.5	32.2	38.9	47.2	58.6	64.3	75.9	82.3

Quality of Writing.

(Scores made in nineteen schools.)

Grades	1	2	3	4	5	6	7	8
City A, School 1	6.9	7.2	7.8	8.4	9.1	9.2	9.3	9.3
" 2	6.4	7.6	8.1	8.5	8.7	9.5	9.4	10.1
" 3	6.3	7.8	7.9	8.2	9.1	9.6	9.8	9.9
" 4	5.4	7.1	...	8.8	9.3	10.8	10.5	11.6
" 5	6.1	7.3	6.3	8.6	9.9	10.0	10.1	11.2
" 6	5.6	7.1	7.9	8.9	9.4	10.2	10.0	9.8
" 7	5.6	...	...	...	8.0	10.7	...	...
" 8	5.9	8.6	7.7	9.1	9.7	8.9	10.9	10.2
" 9	5.7	7.0	8.4	8.2	9.1	9.6	...	...
" 10	6.5	7.3	8.1	8.8	10.0	9.9	10.2	11.0
City B, 3 Schools	...	8.5	9.3	8.9	9.7	9.8	10.7	11.6
City C, School 1	....	8.5	7.6	8.6	9.1	10.5	10.7	10.4
City D, School 1	...	...	7.4	8.8	9.2	10.5	11.5	11.5
City E, School 1	...	8.2	8.4	8.1	8.5	10.0	11.3	11.5
City F, School 1	...	8.8	9.6	8.8	9.5	9.9	11.5	11.2
City G, School 1	7.3	8.5	8.1	9.4	8.3	9.9	9.4	10.5
City H, School 1	6.1	6.7	7.7	10.5	10.9	10.2	10.2	12.2
Averages	6.3	7.9	8.2	8.8	9.2	9.9	10.4	10.8

The efficiency of a given pupil, grade or school can be represented most simply by a graph. Figures 3 and 4 show stand-

ard graph charts. The vertical columns represent the eight grades. The two horizontal lines are the scales for the two elements of writing, speed and quality. The division marks on each scale are so placed that the middle point of any column represents the standard score for that grade taken from the table of standard scores. The numbers on the line for speed are letters per minute, and those on the line for quality refer to the Thorndike scale. Thus the graph of a pupil in the fourth grade who is exactly up to the standard in every respect would be a straight line down the middle of the fourth column. Figure 3 shows extreme differences between pupils

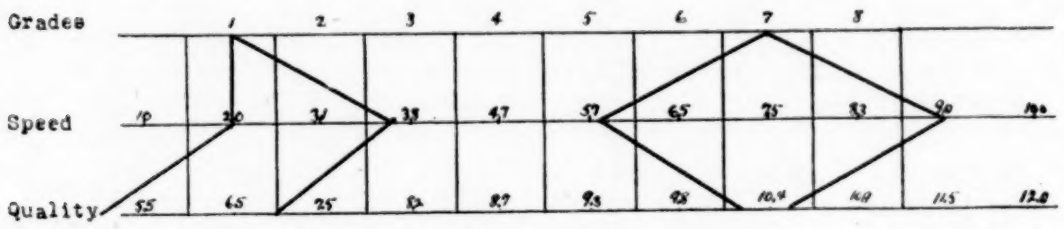

Figure 3 Scores made by four pupils in the same school.

in the same grade. The first pupil in Grade 1 is up to the standard in speed, but very deficient in quality. The second pupil is superior in both speed and quality. The two seventh-grade pupils are up to the standard in quality, but very different in speed, the one being of only fifth-grade ability and the other of more than eighth-grade ability.

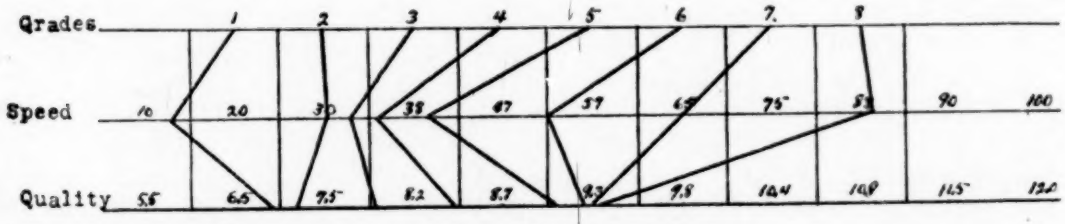

Figure 4 Scores made by the pupils in City A, School 1.

Figure 4 shows the situation in an entire school. Practically all the grades are deficient, particularly in speed. The eighth grade is notoriously backward in quality.

Individual Differences and the Overlapping of Grades. In connection with the reading test in a previous article we saw the extremely wide ranges of reading abilities in the various grades and the large amount of overlapping of the abilities

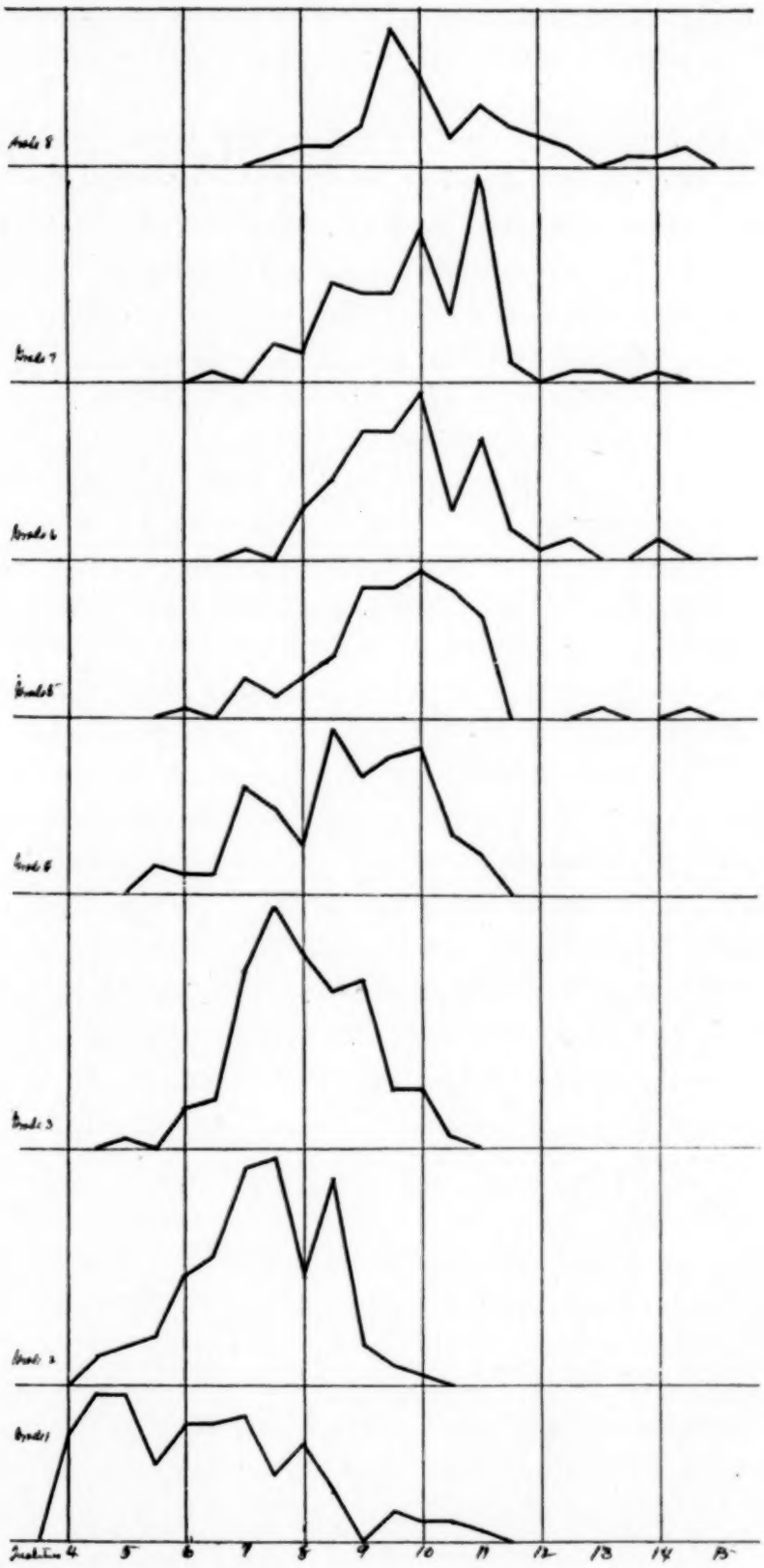

FIGURE 5.—Distribution of pupils of schools 1, 4 and 10 in City A according to quality of writing.

of the pupils in one grade over the abilities of the pupils in adjacent grades. Exactly the same situation obtains in writing.

The wide range in each grade and the amount of overlapping of successive grades in quality of writing are shown in Figure 5 for the pupils of three schools in city A. The curves in this figure represent the distribution of the pupils in each grade. They are all drawn on the same base line, so that a direct comparison can be made. The numbers along the base line are qualities of the Thorndike scale.

The pupils in the first grade range all the way from Quality 4 to Quality 11.5. The pupils in the eighth grade range from Quality 7 to Quality 15. There are five pupils in the first grade who write as well as the average in the eighth grade.

The most realistic impression of the enormous amount of overlapping can be gotten from an inspection of the curves themselves. Any grade overlaps so completely over the next one that the averages of the various grades differ from each other by only small amounts. Expressing these facts in numerical terms, we find that in quality of writing on the average 37.1 per cent. of the pupils of any given grade reach or exceed the median of the next grade above it, 24.0 per cent. reach or exceed the median of the second grade above it, 14.6 per cent. reach or exceed the median of the third grade above it and 7.7 per cent. reach or exceed the median of the fourth grade above it. Statements of the same sort apply to the speed of writing.

COMMUNICATIONS AND DISCUSSIONS.

LEARNING AGAINST TIME.

In a study of "Confusion in Recall" the writer has been finding as a by-product some suggestions upon a subject which is perhaps more vital, namely, "The Effect on Efficiency of Learning Against Time."

At the close of a half-year's laboratory course in psychology a group of 26 girls was divided into two sections of 13 girls each. One section was told to learn the following list of words:

273	732	372	723
beat	tow	desert	waist
statue	meat	week	pear
dessert	waste	stake	toe
steak	kernel	beet	meet
weak	pair	statute	colonel

They were told that the words did not have to be reproduced in exact order, but that they must be given under the respective numbers under which they appear in the test. They were told to use all the time they needed to learn the list correctly, but that they were to learn them as quickly as possible. The time required by each girl of this section was recorded by a girl of the other section.

The average time required by the 13 girls was 14 min. 47 sec. The shortest time required was 8 min. 47 sec., and the longest, 22 min. 40 sec., with an average deviation from the average of 4 min. 28 sec. Nine of the 13 girls made perfect records, while the rest made from one to three errors in omissions and displacements.

The same test was given to another group of girls; but instead of giving them all the time they chose, they were told that they would have just 9 min. in which to learn the list. This was practically the shortest time taken by any member of the first group tested.

Ten of the 24 made perfect records, and the imperfect records were, on the whole, about as good as those of the first group. This means that when the subjects knew they had only a limited time in which to do the task, almost half made perfect records in the time in which a perfect record was made by only one of the first group, working

without a time limit. Furthermore, one does not know how many of the 10 could have done the task in a shorter time than the 9 min. given. Suffice it to say that several stated they were ready "long" before time was called. Furthermore, these 10 out of 24 made perfect records in 5 min. less time than the average time required by the 9 who made perfect records in the first test. Moreover, the second group, though belonging to the same class, was a little inferior to the first in scholastic averages.

These results are not conclusive, as the number of subjects was small. However, they are sufficiently significant to warrant a further study, and accordingly the writer, in collaboration with Prof. Meyers Horner of Daleville College, Virginia, is making a rather extensive study of the problem by the use of the above test, somewhat modified, and given under various conditions and to school grades as well as normal school and college students.

Since the field is so large and has such vital relation to practical education, the writer presents this communication in the hope that others will further test the advantage to the learner of working against time.

Although the records of the experiment herein reported hardly warrant an educational application, their suggestion may call to the reader's mind some interesting facts on the practical side. Almost any student can testify to the fact that when he has habitually postponed the study of one or more particular lessons to a certain period he can succeed with the lessons to a surprising degree. How many a procrastinator has waited until the last few hours to write his oration, to prepare a lecture, to plan for a social occasion, or to do some important piece of work! He procrastinates not so much because it pleases his nature to evade a task for the present, but rather because he is merely waiting for a stimulus in the form of definite fixed limit of time facing him to goad him on.

The easy-going student that crams for examinations even surprises himself by the amount he can do in a short time before examination.

This same principle has for a long time been recognized by the world of industry, where the adoption of the system of piece work has established a continuous working against time. In the field of education this factor in efficiency has been almost wholly ignored.

G. C. Myers.

Brooklyn Training School for Teachers.

ABSTRACTS AND REVIEWS.

CLARENCE TRUMAN GRAY. *Variations in the Grades of High School Pupils.* Baltimore: Warwick & York, Inc., 1913. Pp. 120. $1.25.

This monograph is a study of the grades given the same pupils under different conditions. "The specific problem is concerned with the *relative standing* of pupils in the different years of the high-school curriculum, as indicated by their marks and grades." In addition to comparing different parts of individuals' records, the means of comparing teachers, and of entire schools, are given.

A consideration of the factors underlying the variations, from subject to subject and from term to term, of the grades received by a pupil is undertaken. The conclusion that "the unreliability of teachers' gradings is one of the chief causes for the variations" is well established by the data. Another conclusion of the author is that "some of the causes usually given for variations, such as home conditions, deportment, application, social tendencies, etc., play very little part in the variations." The data point to this conclusion, but it is not clearly indicated that although bad home conditions, etc., may not be correlated with *variability,* they may still be closely correlated with poor work. It also may be true that *changes* in home conditions may be highly correlated with variability in grades.

One obvious peculiarity of certain of the distributions is not discussed by the author. The plate on page 81, showing distribution of grades of pupils in English in school 1, gives a fairly normal distribution, containing frequencies for grades 75, 76, 77, etc., without a break up to 100. A similar plate for school 3 shows frequencies for grades of 75, 80, 84, 85, 89, 91, 93, 95 and 97 only. Some very effective factor, other than individual differences in teachers, is plainly responsible for this pronounced difference in distribution. The author does not mention it. It probably does not vitiate his argument, but an explanation of it would materially contribute to the "internal analysis and comparison of high schools."

A further criticism of the plates giving the distributions of grades, of which there are a goodly number, is the absence of an indicated passing mark. It is inferred from the text that 70 is the passing mark, but some of the distributions are quite inexplicable if this is so

in all cases. If 70 is the passing mark, then the reviewer does not find evidence that any of the pupils in any of the schools failed to pass in any subjects. To avoid concluding that such an utopian condition existed, it is necessary to assume that the distributions cover only those pupils who passed.

The entire study, excepting a few points a little lacking in clearness, constitutes a strong and timely appeal for the education of the teacher as to the significance of marks and methods of marking. Anyone desirous of standardizing the marking system and of interpreting the significance of marks of different schools will find many valuable suggestions in this work.

T. L. KELLEY.

University of Texas.

W. H. PYLE. *The Examination of School Children.* New York: The Macmillan Co., 1913. Pp. 70. Fifty cents.

This work is a compilation in convenient form of materials for those mental tests in Whipple's "Manual" which lend themselves most readily to group work, and of the standard physical measurements with Smedley's tables of physical norms. Specific directions are given for making the tests and for calculating and correlating the results. The chief contribution, however, is in the author's efforts to establish age and sex norms for these tests. The number of cases is small for generalization, but a good beginning has been made.

The value of the work would be enhanced if fuller details were given for presenting the tests and for making calculations of the norms. It would seem also that the material of some of the tests should have been more carefully edited. In the list of abstract words (p. 15) we find "scheme," which few children of the lower grade can spell, and the word "thing," which few experimenters can pronounce so that it can be understood perfectly away from the context. Other tests bear similar marks, as, for instance, the word "mountain" coming first in the genus-species list (p. 30). Many children fail entirely in this test because they cannot react to the first word. These and other inaccuracies, such as the report of the 23.7 girls who took the abstract memory test (p. 16), and of the 1.11 and 2.2 norms for boys, ages 13 to 14 respectively, in the part-whole test (p. 32), and the fact that whole-part instructions are given with part-whole material

(p. 31), makes one hesitate to place entire confidence in the reliability of the tables.

The little book has merit and its good points far outnumber its faulty ones. It is to be hoped, however, that in the annual contributions to this field which the author promises in his preface, we may have closer attention to scientific detail of method and a minimum of such errors and omissions. In its present form the book occupies a unique place in experimental child study and will, no doubt, be the means of stimulating and unifying work along this line in colleges and universities as well as in public school systems. In so doing, its technical defects will be corrected and around it will be built a very desirable and usuable body of scientific material.

L. W. SACKETT,

The University of Texas.

JOHN GAYLORD COULTER. *Plant Life and Plant Uses.* New York: American Book Company, 1913. Pp. xvi, 464.

This is a text-book of most exceptional merit from the pedagogical point of view—and also, we believe, from the botanical point of view. Unlike the bulk of elementary and secondary texts, its organization has been rigorously thought out, and its construction, with equal rigor, has been wrought out. It bears the unmistakable evidence of skilled workmanship in its selection and arrangement of topics, in its lucidity of statement, and in its graded transition from the familiar and the psychologically simple to the unfamiliar and the psychologically difficult. A most suggestive principle of text-book construction has been employed by the author in artfully increasing the amount of "resistance" as the treatment proceeds. We have personally sought through many texts for helpful examples of clear expository teaching; we have never found these examples so numerous or so well adapted to serve as models for students of the technique of teaching as in this book. Of similar pedagogical merit are the questions and suggestions which conclude each chapter. An innovation which appeals especially to the student of text-book construction is the guide for review which occupies four pages at the close of the book. Here all of the technical terms and topics that appear in the body of the book are assembled in three tables arranged in the order of the importance of terms included. The terms in each table that are of fundamental significance are further differentiated

by black-faced type. The young teacher particularly will be able to profit by this attempt to determine relative values within the body of topics treated in a single course. With the large demands that are now made upon the time of the high-school pupil, a type of treatment that does not make essentials and fundamentals stand out sharp and clear is almost certain to miss the mark. If we mistake not, effort in this direction will be the next important step in the improvement of secondary teaching in so far as the presentation of specific subject-matter is concerned. The volume before us consequently stands as a pioneer in what bids fair to be an extensive movement. W. C. B.

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EDITORIALS.

EDUCATIONAL PSYCHOLOGY AND COLLEGE ADMINISTRATORS.

In reading the utterances of college presidents, professors and others the writer has recently been impressed by the tardiness with which investigations in educational psychology percolate into the thinking of college administrators and become a part of their intellectual substratum. We speak of the "antiquated faculty psychology," yet that is the type of psychology that is most in evidence in educational discussions. The limitations of "mental discipline" have been shown in dozens of investigations, yet this is made the cornerstone of argument after argument in the arrangement of curricula or the defense of particular subjects. Any new theory or any attack on an old theory in physics or medicine is quickly taken up and becomes a mental asset to be exhibited on appropriate occasions, but the field in which educators might logically be

expected to be most keenly interested seems to be generally ignored. Even so progressive an administrator as President Nichols of Dartmouth recently gave utterance to the following: "It may reasonably be doubted if one man in a hundred ever takes any single fact from college which he can turn directly into money. What he should take from college are well-trained faculties which he can turn into anything he chooses. It does not matter so much in what studies these faculties have been trained, but it does matter a great deal how much and in what spirit he has worked over them." Obviously President Nichols has not become saturated with recent studies in educational psychology. J. C. B.

THE LECTURER'S ILLUSION.

The information lecture, which had a reason for its existence before the art of printing, holds persistent sway from graduate school to kindergarten in spite of the long recognized condemnation of it by educational economy. The university professor lectures because he believes himself giving advanced information; the college teacher dictates a manual of systematic zoology because he has discarded the textbook method; the secondary school teacher of mathematics "prepares" the lesson because the text does not have the right point of view; the elementary teacher "explains" the lesson because the pupils do not have the habit of reacting to the lesson itself. These lectures are all of the same brand of predigested intellectual food.

There are many reasons for this pedagogical error; lecturing is easy as compared with the skillful eliciting of a pupil's reaction; it gives opportunity for the exploiting of personal opinion; it satisfies the pupil's craving for authority, for excuse from self-exertion, and for the ready-made pellet of serviceable knowledge. Many other such reasons might be given, but the fundamental reason lies in the fact that the teacher feels that this method is successful.

Psychologically, the lecturer may be said to be subject to an illusion which is characteristic of an inceptive elational state. He entertains a warm feeling of satisfaction over the ease, clearness, correctness, frictionlessness, economy and natural fitness of the presentation, and this subjective state of well-being is supported by the objective expression of hearty approval from the pupil and the absence of friction with ignorance. The fallacy lies essentially in the fact that this feel-

ing of satisfaction attaches to the achievement of the lecturer instead of that of the pupil.

A secondary ground for the illusion is found in the tendency to overestimate our own achievements as compared with the achievements of others. Many of these lecturers would discover the frailty of their offerings if they attempted to put them into permanent form. The oral method of instruction has permanent value in many forms, but the information lecture would disappear if those who use it examined the grounds of their feelings of satisfaction with it.

C. E. S.

NOTES AND NEWS.

At the meeting of the American Psychological Association, Philadelphia, December 29-31, there were many papers of interest to educational psychologists. At the joint session with Section L of the American Association for the Advancement of Science the following program was presented: "Habit Formation and Modern Language Training," Stuart H. Rowe; "Initial Speed and Total Gain in Learning," E. A. Kirkpatrick; "Notes on Certain Phases of Learning," S. S. Colvin; "Some Learning Curves," M. E. Haggerty; "Some Norms of College Freshmen," W. V. Bingham (to be published in this JOURNAL); "A Study in Mental Retardation in Relation to Etiology," Bird T. Baldwin; "A Method for Quantitative Study of Family Likeness in Arithmetical Abilities," Margaret L. Cobb.

A session was devoted to mental tests, at which the following papers were scheduled: "The Point Scale Method of Measuring Mental Ability," R. M. Yerkes; "The Point Scale Rating of Delinquents," Thomas B. Haines; "Correlations Between the Binet Tests and Other Mental and Physical Tests," Edward K. Strong, Jr.; "Results of Application of the Binet-Simon Tests to Groups of White and Colored Children," G. R. Wells; "Norms of Negro Mentality," W. H. Pyle; "The Standardization of Knox's Cube and Feature Profile Tests," Rudolf Pintner; "Tests for General Intelligence," Colin A. Scott; "The Influence of Improvement in One Simple Mental Process Upon Other Related Processes," A. T. Poffenberger (to be published in this JOURNAL.)

Other noteworthy papers were "Effect of Heat, Humidity and Stagnancy of Air Upon Mental Work," E. L. Thorndike; "A Proposed Classification of Mental Functions," George A. Coe; "Concerning the Religion of Childhood," W. T. Shepherd; "Effects of Practice on the Singing and Discrimination of Tones," E. H. Cameron; "The Acquisition of Skill in Archery," K. S. Lashley; "A New Method of Studying Ideational and Allied Forms of Behavior in Man and Other Animals," R. M. Yerkes; "Two Cases of Criminal Imbecility," Henry H. Goddard, and "The Value of Anthropometric Measurements in the Diagnosis of Feeble-Mindedness," E. A. Doll.

The meetings of Section L (Education), American Association for the Advancement of Science, Philadelphia, December 30-31, were devoted to papers on educational measurement and on the exceptional child. The papers were as follows: "A Score Card for Physical Growth," Bird T. Baldwin; "The General Effects of Visual Sense Training in Children," C. P. Wang; "Some Results of the Measure-

ment of the Efficiency of Instruction in Reading," H. A. Brown; "Experiments and Measurements in Reading," Walter F. Dearborn; "The Variability in the Use of the Ayres Scale for Grading Handwriting," H. T. Manuel; "An Analytical Method of Judging Handwriting," Frank N. Freeman; "Objective Means of Setting Educational Standards," E. L. Thorndike; "Testing the Reasoning Power in Arithmetic of Eighth Grade Children," James E. Lough; "Norms of Motor Development for Normal Children," J. E. Wallin; "The Size of Class as a Factor in Schoolroom Efficiency," Chas. S. Harlan; "A Study of Home Study," W. H. Heck; "Method and Results of a Cooperative Investigation in Arithmetic," M. E. Haggerty; "Measurements Showing the Effect of Latin in English Vocabulary Building Upon High School Students in the Commercial Course," Albert S. Perkins; "Measurement of Certain Abilities in Algebra," W. S. Monroe (Kansas); "Application of Courtis Arithmetic Tests to College Students," Bird T. Baldwin; "A Picture-Arrangement Test," D. Kennedy Fraser; "A Graded Series of Completion Tests," M. R. Trabue; "Care of Exceptionally Bright Children," M. P. E. Groszmann; "Intelligence and Its Measurement," J. H. Doyle; "The Effects of Blindness Upon Mental Growth," C. Homer Bean; "The Vital Index in Relation to Retardation and Acceleration," B. W. De Busk; "Diagnostic Values of Some Performance Tests," T. H. Haines; "The Selection and Training of the Exceptionally Able Child," David Spence Hill, and "The Cost of Teaching Exceptional Children," Leonard P. Ayres.

The Twelfth Annual Convention of the Religious Education Association will be held at Buffalo, N. Y., March 3-7, 1915. The 30 different meetings of the convention will focus on the topic of "The Rights of the Child." There will be about 100 papers and addresses discussing the place of the child in the family, the churches, the State, the schools and the civic life, and the plans for properly fitting the child for the needs of modern life.

The Department of Superintendence and other sections of the N. E. A. and affiliated societies will meet at Cincinnati, February 22-27. Interesting features of the program are a series of discussions on the training of teachers, the results of plans to measure efficiency in teaching, how shall the efficiency of teachers be tested and recorded, and the investigation of the efficiency of schools and school systems. At the meeting of the National Council the final report of the committee on tests and standards of efficiency will be presented. The National Society for the Study of Education will consider economy of time in the various school subjects. The Society of College Teachers of Education will discuss the work done in departments of education, and the need for a uniform educational nomenclature.

The first number of *Educational Administration and Supervision* makes a favorable impression and gives promise of a high degree of excellence. There is an introductory article by Professor Cubberley on the types of service that the journal may render, an interesting study of the American school superintendent by Professor Coffman, a very clever presentation of the hight-school issue in the form of a dialogue, after the manner of Plato and Berkeley, by Professor Johnston, a study of the way in which American colleges keep their students informed of the judgments passed on their work by their instructors by Professor Davis, discussions, book reviews, editorials and books received. The journal deserves the cordial support of all those interested in administration.

The first number of the new weekly educational journal, *School and Society,* edited by Dr. J. McKeen Cattell, brings interesting articles by Charles W. Eliot, G. Stanley Hall and William T. Foster, comments on educational events, educational notes and news, discussions and correspondence, books and literature, educational research and statistics, and reports of societies and meetings. The new journal bids fair to become the leading American periodical for educational news, and for the informal discusion of topics of current interest.

It is greatly to be regretted that, according to the daily press, the trained horses of Elberfeld, about whose reasoning attainments there has recently been so much discussion in psychological circles, were requisitioned by the Prussian military authorities for an artillery battery, and were killed on a Belgian battlefield.

Thomas F. Vance (Ph.D., Iowa) has been made assistant professor of psychology in the Iowa State College of Agriculture and Mechanic Arts.

World Book Company has moved its Chicago office from 104 S. Michigan avenue to 6 N. Michigan avenue. The office is on the nineteenth floor of the Tower Building, which is on Michigan avenue at the corner of Madison street, halfway between the Public Library and the Art Institute of Chicago. Teachers visiting Chicago are always welcome.

PUBLICATIONS RECEIVED.

(Notice in this section does not preclude a more extended review.)

Agricultural Teaching. Bulletin No. 601. Washington: Bureau of Education, 1914. Pp. 87.

A collection of the papers presented at the fourth annual meeting of the American Association for the Advancement of Agricultural Teaching, held at Washington November 11, 1913.

MARY GOOCH ANDERSON. *Stories of the Golden Age.* New York: The Macmillan Company, 1914. Pp. viii, 231. Forty cents net.

A charming collection of tales from the mythology of Greece and Rome. The stories are so well and yet so simply told that they appeal to even very young children.

FRANK WASHINGTON BALLOU. *Scales for the Measurement of English Composition.* The Harvard-Newton Bulletins, No. 2. Cambridge, Mass.: The Harvard University Press, 1914. Pp. 93.

After some experimenting with the Hillegas Scale in the schools of Newton, the author decided that it was not satisfactory, because it attempted to measure too varied a product, and because the samples in it are not representative of good school work. He therefore determined to construct a scale for each of the four forms of discourse—description, exposition, argument and narration. Out of a large number of compositions written by eighth grade pupils, 25 for each form of discouse were so selected as to be representative of all degrees of quality from the best to the poorest. These selected compositions were read, graded and ranked by each of 24 readers, chiefly eighth grade teachers and supervisors. On the basis of this ranking six compositions, representing the grades A, B, C, D, E and F, were chosen to constitute the scale. The monograph gives a detailed account of the statistical derivation of the scales, and a synopsis of the merits and defects of each composition, as indicated by the criticisms of a considerable number of teachers of English.

MARGARET BEMISTER. *Indian Legends. Stories of America before Columbus.* New York: The Macmillan Company, 1914. Pp. viii, 187. Forty cents net.

These stories are retold for children from the folklore of the North American Indians, as collected by the Bureau of American Ethnology. They will bear comparison with many of the fairy tales col-

lected by the Brothers Grimm, and they form an interesting addition to the "Everychild's Series."

CHARLES SCOTT BERRY. *Some Limitations of the Binet-Simon Tests of Intelligence.* Reprinted from Transactions of the Fourth International Congress on School Hygiene, Buffalo, August, 1913. Pp. 6.

Among the limitations noted are the exclusion of such phases of mental activity as will, feeling, attention, perseverance and docility from the scope of tests; the excessive difficulty of the tests for the higher ages; the gaps in the tests for the adolescent years, and the lack of a standardized procedure.

WILLIAM K. BOYD. *The Finances of the North Carolina Literary Fund.* Reprinted from the South Atlantic Quarterly, July and October, 1914. Pp. 22.

A history of the endowment fund by which public education was maintained in North Carolina from 1825 to 1868. An interesting contribution to Southern educational history.

EDWARD F. BROWN. *Dental Clinics for School Children.* Reprinted from the Journal of the Allied Dental Societies, September, 1914. 437-448.

Under the leadership of the Bureau of Welfare of School Children of the New York Association for Improving the Condition of the Poor, representative New York dentists are advocating the following program for 1915: The establishment of nine additional dental clinics, making fifteen in all; location of clinics in school buildings, with hours from 9 to 5, and with two shifts of dentists, each working half-time; salaries of $1200 per year for half-time work; clinics should extract, provide plastic fillings, and clean teeth only; concentration on children between six and eight years of age; a system of checking the work of dentists, and supply of tooth-brushes, mouth and tooth preparations to school children at cost.

EDWARD F. BROWN. *The Health Supervision of School Children of New York City.* Reprinted from the Medical Review of Reviews, September, 1914. Pp. 10.

The chief weaknesses of the present system are inadequacy in the number of inspectors, so that only a third of the school children are examined in any one year; inadequate nursing staff, so that less than one-fourth of those reported defective receive treatment; and inadequate supply of special clinics for the more careful examination and treatment of pupils with eye, ear, nose, throat and teeth defects.

HERBERT WILLIAM CONN. *Social Heredity and Social Evolution. The Other Side of Eugenics.* New York: The Abingdon Press, 1914. Pp. vi, 348. $1.50 net.

The author of this volume is one of the best-known American writers on evolutionary topics, and anything on this subject from his pen is worthy of consideration. But the present volume is of particular interest to educational psychologists, in that it is a treatise on the learning process as a biological and social phenomenon. For by social heredity the author means docility, or the process of handing on to the coming generation the attainments and acquisitions of preceding generations. The laws of this process the author finds to be quite different from those of organic heredity—so different that in some respects social heredity works directly in opposition to organic heredity. From the antithesis between these two factors in evolution arise considerations of great moment for our attitude toward current problems in eugenics, and the upshot of the argument is to restore to euthenics, or education, the position of importance in social evolution which recent eugenic writers tend to minimize. Interesting and significant chapters are those on the origin of language, the evolution of the moral sense, the origin of the family and the development of different types of social organization, the mental aspects of social evolution, and the contrast between egoism and altruism in evolution. The book is an able and thoughtful study of fundamental questions in education from the point of view of modern biology.

JEREMIAH CURTIN. *Fairy Tales of Eastern Europe.* New York: McBride, Nast & Co., 1914. Pp. vii, 259. $1.50 net.

An attractive collection of tales from Hungarian, Bohemian, Servian and Russian sources compiled by the translator of "Quo Vadis." This brilliant scholar and linguist spent practically his whole life in the study of dialects, customs and folklore of little known tribes and peoples, and the tales in the present volume were collected by him personally during his travels and sojournings in Eastern Europe.

LOREY C. DAY. *Alphabet Friendships.* Reprinted from Pedagogical Seminary, Vol. 21, September, 1914. Pp. 321-328.

An account of a boy's curious relations of intimate friendship with certain letters of the alphabet.

LOREY C. DAY. *The Child God.* Reprinted from Pedagogical Seminary, Vol. 21, September, 1914. Pp. 309-320.

The story of an imaginative world created and developed by a boy between the ages of six and twelve.

WILL EARHART. *Music in the Public Schools.* Bulletin No. 607. Washington: Bureau of Education, 1914. Pp. 81.

A tabulation of the answers to a series of questionnaires on the teaching of music in elementary schools, in high schools, and in State school sytems, and on the provisions made for the training of teachers of music in normal and training schools.

THOMAS D. ELIOT. *The Juvenile Court and the Community.* New York: The Macmillan Company, 1914. Pp. xv, 234. $1.25 net.

A thoughtful, constructive discussion of the work of the juvenile court during the few years of its existence, a consideration of the criticisms that have been made of it, and an examination of its claims for support and continuation. As an ardent friend of the unfortunates in whose behalf the juvenile court was established the author concludes that "the present functions of the juvenile court and its probation office could and should be performed by the school and the domestic relations court."

J. J. FINDLAY AND K. STEEL. *Educative Toys.* London: Blackie & Son, 1914. Pp. 103. 1s. 6d.

This is an account of investigations with Montessori and other apparatus conducted at the Fielden School, University of Manchester, England. On the whole the conclusions are favorable to the use of the Montessori apparatus and method, although the very general nature of the observations and the rambling character of the report make it difficult to determine just what the value is. It is especially to be regretted that the authors deliberately refrained from using any of the controls which would lend a scientific value to their observations. Indeed, their antipathy to the use of the word "experiment" and to the mental attitude that it implies is so frankly avowed that one wonders whether such discussions have any weight whatever.

DOROTHY CANFIELD FISHER. *Mothers and Children.* New York: Henry Holt & Co., 1914. Pp. xiii, 235. $1.25 net.

These delightful essays and anecdotes on the simplest and commonest things in the experiences of children and parents deserve to be read and pondered over by a very large number of American men and women. They are singularly sane and wholesome, and the charming style in which they are written makes them as interesting as a volume of short stories.

GERALD ELTON FOSBROKE. *Character Reading Through Analysis of the Features.* New York: G. P. Putnam's Sons, 1914. Pp. ix, 193. $2.50 net.

The most commendable things about this book are the 56 superb illustrations by Carl Bohnen and the excellence of its mechanical

construction. As for the text, it is scarcely conceivable that such crass phrenology could be inflicted upon a public that professes to have some respect for science. There is a need for serious-minded study of the relation between facial expression and temperament, but this need is in no way met by the pompous and dogmatic characterizations that are to be found on these pages.

CHARLES ROBERT GASTON, Editor. *Swift's Gulliver's Travels.* Cincinnati: The American Book Co., 1914. Pp. 152. Twenty cents.

A useful school edition of this classic.

ELIZABETH HARRISON. *The Montessori Method and the Kindergarten.* Bulletin 602. Washington: Bureau of Education, 1914. Pp. 34.

An account of a visit to one of the "case dei bambini" in Rome, and a discussion of the Montessori methods of procedure by one of the leaders in American kindergarten work. The author recognizes and praises much that is good in the doctrine, but also points out the limitations of the Montessori theory.

DAVID S. HILL. *An Experimental Study of Delinquent and Destitute Boys in New Orleans, and Notes Concerning Preventative and Ameliorative Measures in the United States.* New Orleans: Published by the Commission Council, June, 1914. Pp. 130.

The chief features of this excellent report are a detailed account of the psychological, anthropometric and medical studies of 63 delinquent boys from 8 to 17 years of age, and a survey of the measures that are taken in various parts of the country in dealing with such youth. In the psychological examination four individual tests (form-board, Binet-Simon, color naming, and Aussage) and two group tests (Ebbinghaus-Terman completion test and Courtis-Heck arithmetic test) were used. The examinations showed that not more than 20 per cent. of the boys could be called in any sense defective, but that a majority of them were somewhat slow and dull, doubtless because of their previous manner of life. The last section of the report gives a very good summary of the activities of the most successful agencies for the care of delinquent children.

HENRY BUDD HOWELL. *A Foundation Study in the Pedagogy of Arithmetic.* New York: The Macmillan Company, 1914. Pp. xi, 328. $1.25 net.

This book presents the results of work done in New York University in partial fulfillment of the requirements for the Ph.D. degree. The first 200 pages are devoted to a survey of the literature on the subject. This is divided into genetic studies, including the number ideas of

primitive men, children and arithmetical prodigies, psychological studies on the perception of number, counting and reasoning, statistical studies of efficiency, ideation, transfer, etc., and didactical studies of apprehension. Part II deals with the author's own experiments in number apprehension, and concludes with a detailed analytical study of the application of the Courtis Tests, Series A, to 300 school children from the third to the eighth grade.

DAVID STARR JORDAN AND HARVEY ERNEST JORDAN. *War's Aftermath.* Boston: Houghton-Mifflin Company, 1914. Pp. xxxi, 104. Seventy-five cents net.

The sub-title of this book is "A Preliminary Study of the Eugenics of War as Illustrated by the Civil War of the United States and the Late Wars in the Balkans," and the introduction was written August 25, after the outbreak of the present European war, and discusses some of its probable consequences. There is an account of an intensive study of certain portions of Virginia with reference to the effects of war, and a study of the replies received to 30 propositions expressing the conclusions of the authors and submitted to a large number of thoughtful and open-minded men. The result is a cogent and convincing argument for peace. Unfortunately, however, neither individuals nor nations pay any heed to argument when their passions are roused.

HOMER WALKER JOSSELYN. *Survey of Accredited High Schools and Professional Directory.* Bulletin of the University of Kansas, Vol. xv, No. 16, July 1, 1914. Pp. 252.

So far as the writer's knowledge extends, no other state has such a complete and carefully compiled directory of high school teachers as Kansas. But this is not a mere teachers' directory. The first 125 pages are devoted to a statistical and analytical study of Kansas high-school conditions, and to a discussion of high-school problems that takes rank as a constructive contribution to educational literature. And in view of the fact that it is printed in the directory which every superintendent, high-school principal and teacher will keep at hand, it constitutes one of the most effective means for diffusing new ideas and stimulating school men to act on them.

JOHN KENNEDY. *The Batavia System of Individual Instruction.* Syracuse: C. W. Bardeen, 1914. Pp. xxi, 299.

The Batavia System has been so much talked of and written about that it is a satisfaction to have this authoritative discussion of it by its originator and by those who have personally studied it. True, we must approach the book in an appreciative rather than a critical frame of mind, for we find here only the statements of its advocates

and well-wishers. Many of the pages have a flavor of the rhetorical about them that will have to be credited to the enthusiasm of the particular writer who happens to be quoted. Nevertheless, the whole forms a valuable brief in favor of the Batavia System.

The Kindergarten in Benevolent Institutions. Bulletin No. 605. Washington: Bureau of Education, 1914. Pp. 16.

Includes reports from orphanages, homes and institutions, day nurseries, hospitals and institutions for the feeble-minded and the blind.

Marion Florence Lansing. *Dramatic Readings for Schools. A Practice Book in Dramatics.* New York: The Macmillan Company, 1914. Pp. x, 242. Fifty cents net.

Undoubtedly too much time is devoted to oral reading and too little to silent reading in the schools. But the most unfortunate thing is that much of the time devoted to oral reading is worse than wasted, in that bad habits instead of good ones are formed. Children should be taught to throw themselves into the spirit of what is read and really interpret it. In this respect the present collection of dramatic readings will be of great assistance to the teacher.

William D. Lewis. *Democracy's High School.* Boston: Houghton-Mifflin Company, 1914. Pp. xii, 130. Sixty cents.

This is a group of popular articles reprinted from the *Outlook* and the *Saturday Evening Post.* The author treats of the social aspect of the high school, its relation to the boy, the girl, and the college, and discusses the administration of a socialized high-school curriculum. If the high school is to teach a better type of citizenship, the author thinks that citizenship ought to be made the center of the course of study and required of all pupils. The chief thesis of the book is that the high school should be made to fit the pupil's present capacities and probable future needs.

Lida Brown McMurry. *A Method for Teaching Primary Reading.* New York: The Macmillan Company, 1914. Pp. vi, 80. Fifty cents net.

This is a very stimulating and valuable little book for primary teachers. Part I gives an account of 13 kinds of plays and games that may be profitably utilized in teaching reading. Some of these are very ingenious, and should be of great assistance to the teacher in establishing the associations she desires. Part II discusses the question of "How to use a reader in the primary grades" and enumerates 10 habits which should be kept continually in mind. It would be of great value for the primary teacher to have these rules for habit

formation printed on a wall card and hung up where she could see them every day.

MR. AND MRS. GEORGE WALLINGFORD NOYES. *An Experiment in Home Education.* Oneida, N. Y.: Published by the authors, 1914. Pp. 24.

Describes a model kitchen, and indicates how the necessity of getting on without servants may be made an educational blessing for the entire family. The extra capital required, however, was almost $2000, and few families would be as favorably situated with reference to sources of heat and power supply.

GEORGE HOWARD PARKER. *Biology and Social Problems.* Boston: Houghton-Mifflin Company, 1914. Pp. xix, 130. $1.10 net.

This is the second series of the William Brewster Clark Memorial Lectures, established at Amherst College "to throw light in a genuinely scientific spirit upon the relation of the research, discovery and thought of the day to individual attitude and social policy," particularly that aspect of social policy that has a bearing on social control. The titles of the lectures are "The Nervous System," "Hormones," "Reproduction," and "Evolution." In the first lecture the author indicates the function of the nervous system through the range of animal life as an integrator of reactive behavior, and shows how society is the result of that integration. In the final chapter much is made of the contrast between organic heredity and social heredity, and while biologically what we are depends on the structure of the germ plasms that entered into our make-up, socially what we are depends to a great extent upon the adjustments that we have been trained to make.

L. W. PAYNE, JR. *Learn to Spell. A Practical Handbook for High School and College Students.* Austin, Texas: University Co-operative Society, 1914. Pp. 79. Twenty-five cents.

This little manual contains a brief discussion of the reasons for poor spelling, the elucidation of seven major and seven minor rules for spelling, a list of words frequently misspelled in English composition exercises, and 13 special lists of difficult words apt to be misspelled in the various college subjects.

Perception. Compiled and published by the Class of 1914, Fitchburg, Mass., State Normal School. Pp. 25.

An account of a series of class discussions and exercises on perception, doubtless of considerable value to the members of the class that collected them.

L. A. PITTENGER, Editor. *Macaulay's Speeches on Copyright and Lincoln's Address at Cooper Union.* Cincinnati: American Book Company, 1914. Pp. 94.

Three masterful examples of oratory that will enrich the repertory of high-school readings.

BENJAMIN RAND. *Berkeley and Percival.* Cambridge: University Press. New York: G. P. Putnam's Sons, 1914. Pp. x, 302. 9s. net.

All those who are interested in the development of philosophical thinking will be grateful for the publication of this correspondence between the great English idealist, Bishop Berkeley, and his friend and protector, Sir John Percival, afterwards Earl of Egmont. True, there is much that is trivial and inconsequent in the letters, but they give an excellent picture of the time and the difficulties with which theological philosophers had to contend.

ERNST RIESS AND ARTHUR L. JAYNES. *Caesar, Gallic War, Books I and II.* Cincinnati: The American Book Company, 1914. Pp. 599.

This is a veritably encyclopedic edition of the famous Commentaries. There are beautifully-colored maps, numerous illustrations, abundant notes, an extensive grammatical summary, a series of well-graded exercises in prose composition, and over 200 pages of selections from other writings of Caesar and from Nepos designed for sight reading.

AMY STEEDMAN. *Legends and Stories of Italy.* New York: G. P. Putnam's Sons, 1914. Pp. vii, 188. $1.50.

These delightful stories of old Italian life are not only entertaining, but they bring the reader in contact with the very essence of Italian culture. The sumptuous illustrations in color add greatly to the charm of the stories. Nothing will give greater delight to the children than these fascinating tales.

MENCO STERN AND ROBERT ARROWSMITH. *Aus deutschen Dörfern.* Cincinnati: The American Book Company, 1914. Pp. 162.

A group of simple folk tales vividly depicting incidents in the life of the German common people. An excellent book for beginners.

ROSCOE GILMORE STOTT, Editor. *Selected Poems and Tales of Edgar Allan Poe.* Cincinnati: The American Book Company, 1914. Pp. 172.

A collection of some of Poe's best works.

CLARA HARRISON TOWN. *The Contribution of Visual Imagery to Verbal Thought. A Comparative Study of Seeing and Blind Subjects.* Reprinted from the Illinois Medical Journal, October, 1914. Pp. 15.

Two exercises in spelling were used as tests for imagery. One involved spelling 22 words backward, time and errors being taken as the measures. The other called for recognition by the subject of 22 moderately difficult words spelled backward by the experimenter. The seeing subjects gave slightly the best results. The author does not consider the tests very satisfactory.

J. VARENDONCK. *Recherches sur les sociétés d'enfants.* Bruxelles: Misch & Thron, 1914. Pp. 93. 6 fr.

This monograph presents the results obtained from a questionnaire sent to a considerable number of schools in Belgium, Holland and France. Of the 308 replies received, only 134 were used. The author discusses the nature of the groups, the leaders, their selection and authority, and the attitude of the members toward outsiders and toward each other. The monograph forms an interesting contribution to the development of the spirit of social solidarity.

J. E. WALLACE WALLIN. *The Hygiene of Eugenic Generation.* Reprinted from the Psychological Clinic, Vol. VIII, Nos. 5 and 6, 1914. Pp. 27.

Points out the difficulties and uncertainties in the attempt to determine those who are eugenically unfit, and discusses the relation of alcoholism to feeble-mindedness.

ELLA FLAGG YOUNG AND WALTER TAYLOR FIELD. *The Young and Field Literary Readers.* Book Three. Pp. 288. Forty-eight cents. Book Four. Pp. 320. Fifty-two cents. Boston: Ginn & Co., 1914.

Book Three contains selections from Grimm, Stevenson, Eugene Field, Edward Lear and Hans Anderson, and legends of the American Indians, the Norsemen and the Greeks. Book Four presents stories from home life, legends and folk tales, fairy stories, animal stories, stories of life in other lands, and stories from American history.